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Supersonic Inspection of Cast Rolls

Currentless Nickel, Cobalt Plating

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 121, NO. 3 JULY 21, 1947

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RM-12

July 21, 1947

First Order of Business

Leaders of American industry and all others whose collective thinking may play a part in determining the future policy of this nation in regard to world affairs should be quick to recognize the tremendous importance of the Truman doctrine, the Marshall plan and similar proposals dealing with our responsibilities abroad. The implications of these projects can mean more to the success or failure of the American way of life than those of any other problem now visible on the horizons of either the domestic or the international scene.

The objectives of "containing" communistic nations and of helping to restore the economies of Europe and other war-devastated areas cannot be accomplished merely by investing, lending or making an outright gift of untold billions of our dollars. If this money is to do any lasting good, its distribution and use must be administered intelligently and the quantity and quality of our representation abroad must be increased tremendously. This entails a type of foreign service in which we have had little experience of value. It seems almost inevitable that if we decide to go through with the Truman and Marshall proposals, we will commit ourselves to administrative responsibilities that will require a set-up of government agencies only moderately less complicated and colossal than that required for a shooting war.

In short, we will run the risk of reversing the present trend of curtailing government activities. It is not difficult to envision a return of many wartime controls if we go into these new undertakings on a full-fledged basis. It is entirely possible that the power of the federal government again would increase at the expense of rights and freedoms of individuals.

Against these and other risks are the unpredictable advantages that would accrue if we were successful in these undertakings. The opportunities for better international relationships and everything that entails in increased trade and, above all, in eventual world peace and stability are beyond calculation. At no time in the world's history has any nation been faced with a problem so rich in reward for its successful solution or so fraught with risk if it is bungled.

That is why it is so acutely imperative that the nation's best minds—in Congress, in business, in labor and everywhere—become concerned immediately and deeply with the principles and details of our foreign policy. It is easily the No. 1 item of business on the agenda of the nation and of its thinking citizens.

* * *

LESSER OF TWO EVILS: Announcement by General Motors that it has become necessary to close certain fabricating and assembly plants because of the "disturbed condition in the steel industry caused by the coal mining situation during the first two weeks in July" emphasizes anew the difficulty of maintaining mass production at high levels unless all of the materials and services essential to that operation are at hand and in balance.

At times assembly lines in several industries have operated at slower than normal speeds for various reasons. Sometimes lines are slowed to a snail's pace because of a shortage of personnel at key work stations. In other instances, as in the case of General Motors, shortage of materials or components slows the tempo.

Production under such handicaps is achieved at an abnormally high cost per unit. When this situation develops, is it not wiser for management to halt operations and wait until materials, components and services are available in balanced supply sufficient to support economical operation?

Considering the present unsatisfied demand for

(OVER)

many mass produced items, it is unfortunate that assembly lines must be slowed or stopped. Nevertheless, if manufacturers can contrive to schedule a short shutdown at a time when vacations are due, they not only can accumulate inventory for more economical production later on but they also help suppliers to gain a little bit on demand.

—pp. 83, 161

* * *

WAGE-PRICE PUZZLE: President Truman's request that industry hold back on price increases until it can determine by experience how much recent coal wage advances will affect costs is in line with the wishful thinking of many manufacturers who hope that somehow something will happen to permit these increased wages to be absorbed at present prices.

However, the President's plea and the blind hope fail to take into account the factor of the time element. The wage increases of the past few years have been made effective immediately or even retroactively, whereas the opportunities for combating them by higher productivity or greater efficiency are constantly being postponed by inability to obtain improved plant and equipment.

One company could absorb recent wage advances if certain new machines were available, but earliest promised delivery is two years away. Another can cut material handling costs in half when it moves into its new plant, but that move still is months away.

This wage-price business is not as simple as it seems. —p. 70

* * *

PRIVATE TRADE GAINS: Some encouragement can be had from reports that a number of countries are beginning to resume trade with areas that were over-run or seriously affected by the recent war.

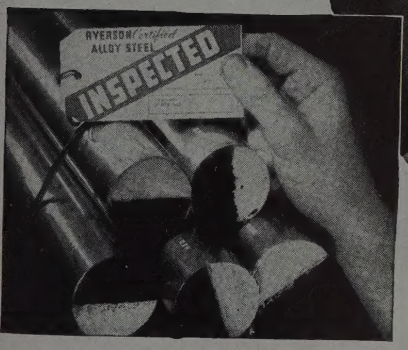
For instance, Sweden has agreements with Austria, Russia and the Russian and Anglo-American zones of Germany for the interchange of materials and equipment. Italy is doing business with the United States, Mexico, Brazil and Russia. Also, following close on the decision of General MacArthur's Supreme Command Allied Powers to re-establish private trade with Japan comes the announcement from SCAP that starting July 15 a limited number of traders are permitted to do business in Korea.

These are but faint moves in the direction of extensive free trading that must eventuate before the world can recover from its present economic ills. Real progress will come when more of this trade can be handled privately and less of it has to go through government channels. —pp. 80, 81

SIGNS OF THE TIMES: On the assumption that some new models of machine tools are being held off the market until the opening of the National Machine Tool Show in Chicago in September, a large automobile manufacturer (p. 75) has sent letters to machine tool builders urging them to release new equipment now and stressing the need of his company for higher speed metalworking equipment as soon as it can be delivered. . . . It is reported (p. 81) that Moscow has ordered that 2 million tons of scrap be collected in the Russian zone of Germany. Judging from the volume of twisted structural steel and damaged stationary and mobile equipment in the war-devastated areas of Germany, this assignment should not be too difficult of fulfillment. . . . Co-operating with the American Institute of Architects, a committee of the American Washer & Ironer Manufacturers' Association (p. 74) is working for "modular coordination" in planning kitchens and utility rooms for American homes. If the idea materializes, appliance dimensions will be multiples of a standard measurement unit, so that architects will be able to fit all major kitchen and home laundering equipment snugly into rooms built from material of standard dimensions. . . . Tests on 12 per cent chromium, low carbon steel specimens, made in connection with joining blades of steam turbine rotors (p. 104), show that by controlling brazing temperatures joints can be made that are 50 to 100 per cent stronger than has been possible heretofore. . . . A letter from the National Archivist to interested government agencies stating that the files of the defunct OPA soon will be available to research workers and economists (p. 76) has aroused fear in some quarters that information that was submitted by manufacturers to OPA with the understanding it would be treated as confidential may fall into unauthorized hands. . . . Expansion and improvement program now under way at the Steubenville, Benwood and Harmarville works of Wheeling Steel Corp. (p. 86) eventually is expected to involve expenditures of $32,125,000. . . . National Labor Relations Board, in preparation for enforcing the Wagner Act as amended by the Taft-Hartley law (p. 79), has issued instructions to regional offices on how to dispose of the 5100 complaint cases pending when the law was changed. . . . Recent and current shutdowns of automobile plants for vacation, steel shortage and inventory reasons (p. 83) will mean a production loss of over 60,000 cars and trucks.

E. L. Shaner

EDITOR-IN-CHIEF



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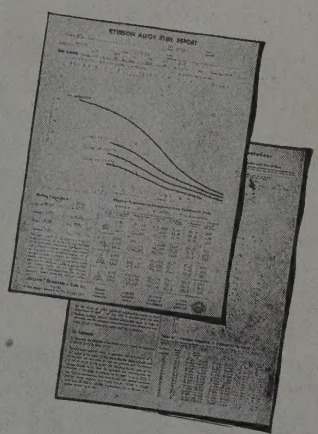

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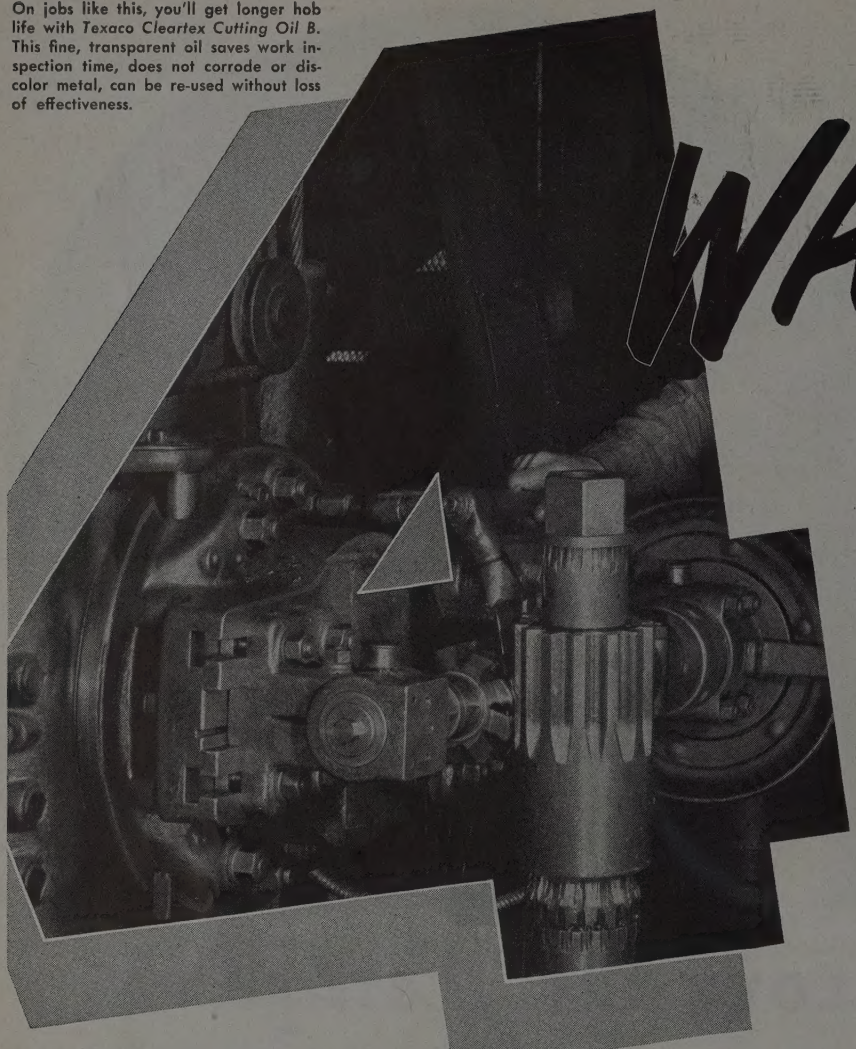

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Small size carbon cars are scarce items in the stock rooms of most metalworking plants, and are ranked next to flat-rolled steel as critical material

STEEL
July
21
1947

Bar Supply Spotty; Small Sizes Most Stringent

Larger sizes in carbon stock, most alloy sizes, in closer supply-demand balance. Cold finished easier than hot-rolled. Production establishing peacetime record, but won't catch up with demand before year's end

BUYERS of hot-rolled carbon bars in the smaller sizes are having almost as much difficulty in obtaining their requirements as are the users of the critically scarce flat-rolled products.

In contrast, alloy and carbon bars in the larger sizes are fairly easy. Cold-finished bars are generally in better supply-demand balance than are hot-rolled bars.

Less than 30 per cent of users have a 60-day inventory of hot-rolled carbon bars and only 7.3 per cent have 90-day stocks, a recent check of steel consumers' inventories revealed (STEEL, June 16, p. 57). Only 42.5 per cent can obtain deliveries within 60 days.

Alloy bars generally are in fair balance, with 63 per cent having stocks adequate for 60 days or longer. Sixty-three per cent of users can obtain deliveries in 60 days or less.

The overall inventory and delivery figures for hot-rolled carbon bars, however, do not tell the complete story, as many consumers report they have adequate supplies of the larger sizes but that stocks of small sizes are depleted. This spotty situation presents many operating difficulties for metalworking plants using small size bars. The difficulty fans out through other metalworking plants requiring bolts, nuts, rivets, screws, small forgings and other components fabricated from small bars.

The outlook for balancing demand and supply by year-end or first quarter appears fair. Present production is at a record peacetime rate and is approaching the peak wartime levels when many bars, including the larger sizes, were required for military uses.

Output of hot-rolled bars, including alloys, for the first five months totaled 4,420,829 net tons. May production was 922,591 tons, or an annual rate of slightly more than 11 million tons. These figures include shipments to members of the industry for conversion into further finished products or for resale. Hot-rolled bars account for slightly more than 15 per cent of total finished steel products.

Maximum annual potential capacity for hot-rolled bars is slightly more than 22 million tons. This represents the maximum total that could be produced under full operations, assuming exclusive use of all available facilities and without regard to the availability of ingots.

Actually, ingot production must be allocated to the various steel products and bars are getting only their fair share, between one-sixth and one-seventh of the total.

During the war, the government financed certain bar-making facilities designed to provide material needed for the prosecution of the war. These included: Crucible Steel Co. of America, Harrison, N. J., 100,000 tons; Republic Steel Corp., Chicago, 36-in. and 32-in. mills, 480,000 tons; Allegheny Ludlum Steel Corp., Dunkirk, N. Y., alloy bar and wire mills, 19,623 tons; Copperweld Steel Co., Warren, O., 24-in. and 21-in. bar mills,

220,000 tons and cold-drawn bar mill, 24,000 tons; Timken Roller Bearing Co., Canton, O., tool steel bar mill, 5000 tons; Eaton Mfg. Co., Massillon, O., cold-drawing facilities, 21,000 tons; Superior Drawn Steel Co., cold-drawing facilities, 30,000 tons. Cold-drawing facilities also were installed at East Hartford, Conn., rolling mill facilities at Cleveland, and heat treating facilities for making annealed bars at Beaver Falls, Pa., Gary, Ind., and Massillon, O., all operated by Republic Steel Corp.; alloy bar finishing facilities at East Chicago, Ind., operated by Youngstown Sheet & Tube Co.; and cold-drawing facilities at Detroit, operated by Plymouth Steel Co.

Republic Steel's large DPC mill at Chicago, originally built to produce large bars, is being revamped to include facilities for smaller bars and will start operations soon. Many of the other government-financed mills are primarily for the production of alloy and cold-finished bars.

The causes for the shortage in small size carbon bars are similar to those causing the shortage in flat-rolled steel and other products now in high demand.

HOT-ROLLED BAR OUTPUT

Year	Net Tons	Year	Net Tons
1947 (5 mos)	4,420,829	1941	10,978,698
		1940	7,885,261
1946	9,843,933	1939	6,138,350
1945	10,484,218	1938	3,484,923
1944	11,161,194	1937	6,755,012
1943	11,858,047	1936	6,822,492
1942	11,939,982	1935	4,767,187

During the war, consumption leaned heavily to large stock for war materials and included many alloys. Increases in bar capacity mostly were for heavy bars and often were located near mills producing alloy steel. Many prewar plants using small carbon bars for peacetime products converted to war production work and when reconversion started had to build their inventories of small size bars anew. Hundreds of such plants entered the market to buy small bars for both inventory and to maintain a record rate of production. In addition, many other plants which were started during the war converted to peacetime production and began clamoring for small bars. The result has been that despite high production (except when the steel industry was down because of steel or coal strikes) the output just has not been enough to rebuild inventories and sustain a record production.

Preferential allocations to certain favored programs, notably freight cars and home construction, are siphoning off a percentage of bars and bar-size shapes which otherwise would go to other consumers. The bulk of production, however, still is going to the converting and processing industries, to warehouse distributors, and to the makers of machinery and tools, farm implements, automobiles, and contractors' products.

While a shortage of ingot is the primary obstacle to increasing small bar production, certain technical problems also cause difficulty. In some cases, mills producing large size bars are being kept in operation, even though the supply of the larger sizes is fairly easy, in order to retain the labor crews operating these facilities. Were the large bar mills shut down to divert more steel to the mills rolling smaller sizes, the crews employed on the large mills probably would be lost. Transfer of workers from one mill

FINISHED STEEL SHIPMENTS IN MAY AND YEAR TO DATE

Steel Products	Number of companies	Items	MAY - 1947			To Date This Year			Whole Year 1946		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	41	1	227,755	4.2	210,858	1,091,156	4.2	914,814	1,949,624	4.0	1,645,748
Structural shapes (heavy)	13	2	382,345	7.0	334	1,859,768	7.2	1,409	3,474,284	7.1	5,399
Steel piling	3	3	25,547	0.5	-	133,285	0.5	23	205,313	0.4	141
Plates (sheared and universal)	29	4	578,773	10.6	14,726	2,571,988	9.9	90,803	4,152,181	8.5	250,709
Skelp	6	5	11,764	0.2	35,670	70,155	0.3	164,184	227,033	0.5	194,666
Rails—Standard (over 60 lbs.)	4	6	183,207	3.4	9	929,014	3.6	264	1,790,311	3.7	4,890
—All other	5	7	20,490	0.4	-39	78,798	0.3	167	144,999	0.3	426
Joint bars	7	8	14,617	0.3	1,615	78,465	0.3	6,222	176,803	0.4	5,327
Tie plates	8	9	46,441	0.8	499	207,383	0.8	2,858	447,496	0.9	18,700
Track spikes	8	10	15,186	0.3	-	75,804	0.3	54	146,194	0.3	693
Hot Rolled Bars—Carbon	33	11	561,134	10.3	71,157	2,665,425	10.3	334,704	5,006,859	10.3	707,991
—Reinforcing—New billet	16	12	97,158	1.8	659	507,854	2.0	3,692	1,048,483	2.1	7,381
—Rerolled	11	13	16,330	0.3	-	62,881	0.2	-	141,346	0.3	1,267
—Alloy	26	14	158,936	2.9	17,217	755,751	2.9	90,522	1,390,278	2.8	138,392
—Total	44	15	833,558	15.3	89,033	3,991,911	15.4	428,918	7,586,966	15.5	855,034
Cold Finished Bars—Carbon	29	16	130,464	2.4	1,035	672,078	2.6	3,651	1,316,579	2.7	2,428
—Alloy	26	17	20,194	0.4	136	109,615	0.4	710	196,237	0.4	1,725
—Total	35	18	150,658	2.8	1,171	781,693	3.0	4,361	1,512,816	3.1	4,153
Tool steel bars	19	19	8,230	0.1	497	41,503	0.2	2,228	96,020	0.2	371
Pipe & Tubes—Butt weld	15	20	156,758	2.9	6,709	* 685,638	2.6	27,283	1,276,289	2.6	45,393
—Lap weld	8	21	35,997	0.7	69	169,660	0.6	625	305,516	0.6	238
—Electric weld	11	22	91,207	1.7	126	* 399,142	1.5	* 980	674,459	1.4	591
—Seamless	10	23	182,022	3.3	11,299	* 870,529	3.4	61,303	1,871,540	3.8	83,441
—Conduit	7	24	13,488	0.2	765	* 56,778	0.2	* 3,464	98,521	0.2	2,448
—Mechanical and pressure tubing	13	25	55,782	1.0	2,585	* 272,856	1.0	8,650	429,180	0.9	3,478
Wire rods	22	26	63,516	1.2	24,002	271,296	1.0	135,029	679,998	1.4	346,506
Wire—Drawn	38	27	219,708	4.0	14,670	*1,070,473	4.1	* 76,382	1,933,124	4.0	135,592
—Nails and staples	18	28	69,566	1.3	1,451	363,948	1.4	3,834	636,632	1.3	797
—Barbed and twisted	15	29	23,368	0.4	5	104,067	0.4	13	207,610	0.4	-
—Woven wire fence	13	30	37,632	0.7	306	175,572	0.7	1,628	383,230	0.8	-
—Bale ties	12	31	11,053	0.2	-	51,375	0.2	-	99,993	0.2	-
Black Plate—Ordinary	9	32	63,539	1.2	254	351,372	1.4	1,237	781,167	1.6	3,179
—Chemically treated	8	33	568	-	-	14,161	0.1	-	125,170	0.3	-
Tin and Terne Plate—Hot dipped	9	34	168,178	3.1	-	800,182	3.1	228	1,924,657	3.9	-
—Electrolytic	9	35	137,109	2.5	-	592,850	2.3	529	909,173	1.9	-
Sheets—Hot rolled	30	36	613,519	11.3	50,984	2,992,669	11.6	250,719	5,521,463	11.3	421,198
—Cold rolled	17	37	474,171	8.7	2,777	2,226,447	8.6	10,273	4,075,554	8.4	3,397
—Galvanized	16	38	135,790	2.5	60	661,260	2.6	189	1,462,033	3.0	1,725
—Electrical and enameling	10	39	50,297	0.9	-	234,472	0.9	307	435,170	0.9	-
Strip—Hot rolled	23	40	150,433	2.8	22,880	727,585	2.8	125,304	1,363,812	2.8	237,176
—Cold rolled	34	41	141,973	2.6	2,399	* 674,939	2.6	12,920	1,282,146	2.6	25,904
Wheels (car, rolled steel)	2	42	33,020	0.6	-	156,277	0.6	2	252,308	0.5	348
Axles	5	43	15,078	0.3	-	74,365	0.3	53	130,461	0.3	221
All other	-	44	-	-	-	-	-	-	6,266	-	-
TOTAL STEEL PRODUCTS	141	45	5,442,343	100.0	495,714	*25,908,836	100.0	*2,337,257	48,775,532	100.0	4,297,889

*Adjusted.

to another is complicated by the housing problem.

Relatively easier supply of cold-finished bars as compared with hot-rolled is attributed to the better profit some producers realize on cold-drawn products, and to distribution patterns developed during the war.

In some localities, an easing in demand for small carbon bars has been noted within the last few weeks. This is not believed to represent a general trend, but reflects curtailment of metalworking activities due to scarcity of flat-rolled steel or other materials.

Improved copper supply may help ease the present tight supply situation for small screw machine bar stock. In the past, it has been a tossup between brass and steel in some instances for this type of work. Brass costs more but is easily worked and permits fast operations.

Pricewise, the bar market is expected to move higher soon in line with general revision of steel prices. Producers expect to make adjustment in extra schedules to correct inequities uncovered since the last revisions last spring.

Gray Iron Shipments Up

Shipments of gray iron castings in May totaled 1,097,307 short tons, the highest point since the Census Bureau began keeping these statistics in January, 1943. May's total, however, was only slightly higher than that for April when 1,097,150 tons were shipped. Shipments of castings for sale amounted to 633,013 short tons, 58 per cent of the total. The remaining 464,294 short tons were produced for manufacturers' own use.

The volume of cast iron pressure pipe and fittings shipped reached a new high amounting to 94,320 short tons, an increase of 15 per cent over April's shipments. Shipments of molds for heavy steel ingots also increased to 160,361 tons from 151,015 tons. Both chilled iron railroad car wheels and cast iron soil pipe and fittings showed small decreases, the former dropping from 69,458 to 67,111, and the latter from 54,351 to 51,370.

Malleable Castings Down

May shipments of malleable iron castings were 75,487 short tons, a decrease of 8 per cent from the 81,890 tons shipped in April. Of total shipments, 42,294 tons, or 56 per cent, were shipped as rough castings to outside consumers; the remaining 33,184 tons were for the producers' own use.

Steel Castings Show Drop

Shipments of steel castings amounted to 140,847 short tons in May, a decrease of 2 per cent from the 144,175 tons shipped in April. Carbon steel castings accounted for 106,727 tons, 76 per cent of the total, and alloy steel castings for 34,147 tons.

There were decreases in both castings for sale to the trade and those produced for manufacturers' own use. Castings for sale, totaling 103,779 tons, accounted for 74 per cent of the total shipped; 37,095 tons were shipped for the makers' use.

Food Can Shipments Higher

Metal can shipments in May were 207,483 short tons, which was 2,459 tons more than shipped in April. This tonnage, however, was far below the level of activity in May, 1946, when 248,662 tons were shipped. The increase over April shipments was the smallest at this time of year since 1943. However, shipments of cans during the first five months of the year, at 925,411 tons, were still running ahead of shipments for the comparable period of 1946.

Steel Forging Shipments Fall

Shipments of steel forgings in May amounted to 210,772 short tons, decrease of 6 per cent from the 223,787 tons shipped in April. Of the May shipments, 115,743 tons, or 55 per cent of the total, were for sale to the trade. The remaining 95,029 were for the producers' own use. May shipments of drop and upset forgings amounted to 158,999 tons, 7 per cent under the 170,993 tons shipped during April. Shipments of press and open hammer forgings during May totaled 51,773 tons, a decrease of 2 per cent from the April shipments.

Shipments of Aluminum Drop

Net shipments of aluminum wrought products was 106 million pounds in May, 5 per cent less than the 111 million pounds shipped in April. This was the fourth successive monthly decline and sent shipments to the lowest level since last July. Shipments of each of the aluminum product groups in May fell below the comparable figures for April. Aluminum plate, sheet and strip shipments, which accounted for slightly more than 75 per cent of the entire quantity shipped, amounted to 81 million pounds.

Present, Past and Pending

■ REPUBLIC BUYS SURPLUS OHIO COKE PLANT

WARREN, O.—Republic Steel Corp. has purchased a coke plant here with 325,000 tons annual capacity from the War Assets Administration. Plant was built by the government in 1943 and since has been operated by Republic. Republic also has signed 10-year leases for a government-owned blast furnace, with 392,000 tons capacity, in Youngstown and a sintering plant in Warren.

■ AUTO UNION WILL SHUN LABOR BOARD

DETROIT—International Executive Board of the United Automobile Workers-CIO has announced the union will "refrain from calling upon the new National Labor Relations Board for any assistance whatsoever," contending the Taft-Hartley labor law places "insurmountable obstacles in the path of all labor organizations."

■ CLAUSSEN JOINS STEEL INSTITUTE

NEW YORK—John A. Claussen, for many years active in pig iron sales in the New York area and later affiliated with government agencies in handling pig iron distribution during the war, has been retained by the American Iron & Steel Institute committee on merchant pig iron to handle problems arising in that commodity. C. A. Wilson has been appointed research engineer, committee on reinforced concrete research.

■ C & O AWARDS PIER EQUIPMENT CONTRACTS

CLEVELAND—Chesapeake & Ohio Railway has awarded contracts to Link-Belt Corp., Chicago, for dumpers and conveyors to cost approximately $1,600,000 for a new low-level coal pier under construction at Newport News, Va. Alliance Machine Co. has been awarded contracts for steel towers to cost $1,400,000.

■ PLATE ROLLING MILL SHIPPED TO DENMARK

PHILADELPHIA—A steel rolling mill with a capacity of 200,000 tons of plates annually has been loaded here for shipment to Denmark. Mill originally was built for Youngstown Sheet & Tube Co. and during World War II was transferred to the Houston, Tex., plant of Sheffield Steel Corp. where it was used for rolling ship plates.

Metalworking Shops Await Steel Hike

Future pricing policies of manufacturers hinge on extent of steel price increase. Some market observers now look for only $3 per ton average increase by steelmakers

HOW much will steel prices be advanced?

That was the big question awaiting answer in metalworking circles last week as a boost in steelmakers' published quotations in the immediate future appeared as certain as death and taxes.

With coal prices up a minimum of 75 cents per ton because of the miners' wage boost, and scrap prices again soaring, steelmakers seemed to have no alternative to raising their prices especially in view of the fact price lists were not revamped after the steelworkers got their wage increase in April. One large independent steel interest estimates that costs on its output in April, a relatively good month, if refigured on June costs, would be up about $4 per ton of finished steel.

Steel buyers, for the most part, agree that all of the factors add up to a price raise and they do not think President Truman's plea to industry to delay effecting increases pending thorough digesting of the miners' pay boost will materially alter the situation.

Expectations are industry-wide steel increases will be held off until the end of this month at earliest. As a general thing, independent steelmakers are expected to delay action pending announcement of policy by United States Steel Corp. subsidiaries, though last week two producers of southern pig iron raised prices $3.50 per ton while a small eastern producer raised light rails, rail steel reinforcing bars and merchant carbon bars $5 per ton. These increases, however, are considered exceptions to likely general industry policy, with most producing interests marking time pending action by the Steel corporation. And it is not believed the latter will publicly announce its policy until after the quarterly meeting of its directors July 29. For that matter even that date may be out in view of the statement attributed to Benjamin Fairless, president, vacationing in Honolulu, that the Steel corporation will not increase steel prices until a "fair test" is made of the cost factors created by the coal wage settlement.

Immediately after the miners won their wage increase hints were thrown out that an average $5 per ton increase on steel products was likely to be effected. Last week however, while the $5 average increase still bulked large in trade gossip, comment in some steel circles was that the increase may average closer to $3 per ton, with the major part of the raise on such products as galvanized sheets, pipe and tubing, concrete reinforcing bars, and possibly plates, shapes and large size bars. Some specific products, it is said, will likely be advanced a maximum of $7 per ton. Expectations are that sheets, strip and tin plate, chiefly used in consumer goods manufacturing industries, would not be sharply increased though a substantial boost on hot-rolled sheets would not be unexpected since profit return on this item is said to be out of line.

That the steelmakers find themselves in an increasingly ticklish cost position is reflected in the quoted statements of important industry executives. Charles M. White, president, Republic Steel Corp., Cleveland, commenting on President Truman's request to hold the price line said that: "The time has come when we must recognize a relationship between the cost of producing a commodity and its selling price. These cannot be controlled by the hopes, desires or whims of anyone." He pointed out that it is impossible to ignore any further the substantial increases in costs resulting from wage increases to steel workers and coal miners.

Irving S. Olds, chairman, United States Steel Corp., said the rise in coal miners' wages will probably necessitate an increase in prices of coal and steel as well as in the prices on other products whose manufacture requires coal.

Other steelmakers talk in similar vein. A spokesman for Allegheny Ludlum Steel Corp., Pittsburgh, stated his company is gravely concerned over the

AIR-BORNE FOUNDRYMAN: Riding his moving machine in the best style of a Hollywood cameraman, this operator pulls the control stick to hurl a column of molding sand into a large flask at the Trafford foundry of Westinghouse Electric Corp. in Pittsburgh. The "sand-slinger" is one of the latest devices installed as part of a modernization program. The machine delivers sand from an overhead storage bin and rams it into the mold at a rate of 1000 pounds a minute

impact of added costs to production. A Wheeling Steel Corp. official stated the industry can hardly hope to absorb the additional cost burden, adding that certain of his company's products now are being sold for less than cost. A small steelmaker who buys semifinished steel from the larger producing companies states he will have to raise his prices to the extent his costs rise.

Metalworking Companies To Pass Along Increases in Steel Prices

PENDING definite action on steel prices, manufacturers of consumer and capital goods made of steel find themselves in an uncertain position with respect to future costs. Some indicate they may be able to absorb whatever increase is effected, but others feel that additional costs cannot be absorbed above a certain point despite volume production, and that at least part of the increase will have to be passed along to consumers.

Metalworking industry executives' views at important manufacturing points, as developed by STEEL's district editors, follow:

PITTSBURGH—Nearly all fabricators in this district will have to pass on to customers at least a portion of the anticipated advance in steel prices. However, until extent of the pending steel price advance is known, and how it applies specifically to individual products, it will be impossible to determine full impact of such action on manufacturers' operating costs.

Nearly all concerns indicate they will attempt to absorb at least a portion of the pending steel advance, but add that profit margins have been considerably narrowed in recent months as result of having to meet practically the same wage increases granted by basic steel producers. Most, but not all companies, did not raise their prices this spring to reflect higher wage costs, and it should also be noted these companies had to absorb the steel price increase early this year. Westinghouse Electric Corp., for example, attempted to absorb the increased wage costs that developed this spring, but recently found it necessary to raise refrigerator prices an average of 3.75 per cent.

Increased competition is said to be one important factor restraining many metalworking companies from passing along steadily rising operating costs to customers. This condition is the chief reason some companies are expected to be forced to absorb at least a portion of the increased production costs that are bound to follow should steel prices be raised.

CHICAGO—Manufacturers of consumer and capital goods recognize a moderate steel price increase is justified by the economics stemming from recent events. The wage increase granted miners plus that given to steelworkers several months back add up to cost levels which cannot be completely absorbed by mills even at near-capacity steel production.

To what extent higher priced steel will have to be passed to purchasers of manufactured goods cannot yet be determined. There is widespread feeling the last increase in steel prices several months ago, accompanied by broad overhauling of extra schedules, was set at a level which anticipated, in some degree, the higher wages granted steelworkers.

Most manufacturers feel it premature to discuss what action they will take until the magnitude of steel price advances is known. Production schedules have been improving over recent weeks and on the basis of this larger volume a certain degree of higher steel cost can be absorbed. Above this point, profit will be jeopardized, and some share will have to be borne by the consuming public.

In certain fields, like electrical appliances, inventories in hands of retailers are reasonably good and competition is developing. Thus higher prices would not be conducive to stimulating sales. Rather, the higher prices would tend to restrict sales. In other lines, where demand still exceeds supply by a wide margin, moderate price increases probably would not discourage buying dangerously.

CLEVELAND—Opinion here is mixed among metalworking and fabricating firms as to the effect of a steel price increase on the market for their products. Spokesman for a large automotive company thinks the increased cost of steel would inevitably have to be passed along to consumers although it would require some time since the whole cost structure would have to be examined to determine full extent of the increase. He feels the action would definitely be inflationary, but that his company cannot absorb an increase in the price of steel at this time.

J. D. Wright, vice president and secretary, Thompson Products Inc., said it was too early to say what his company would do. Action would depend entirely upon what the different kinds of steel used would cost.

Dan W. Holmes, general sales manager, Parker Appliance Co., said small increases in steel costs would be absorbed. If, however, steel prices were to go up sharply, he said, some fittings prices would have to go up. The company uses bar stock, pipe and tubing.

A. Meddick, vice president and sales manager, Elwell-Parker Electric Co., said an increase in steel prices would not affect the cost of manufacture of industrial trucks and cranes too much on such items as structurals used in their manufacture. However, in raising all steel prices, mills would be forcing suppliers to increase their prices and what appeared at the mill level to be relatively small increases would have multiplied by the time they reached an end-product manufacturer. A similar situation occurred during the period when OPA was in effect. Industrial truck prices were frozen; however, an increase in malleable parts was granted. These parts are widely used in the company's trucks and the cost of manufacture was substantially increased despite a relatively low original price increase on each part. In truck manufacture where many alloy parts are used, the increased prices would probably be far greater than for carbon steel components.

Speaking on the effect of higher prices on demand for electric industrial trucks, he said unquestionably some small potential buyers would go out of the market, but because higher labor costs are an important factor in increased use of materials handling equipment, overall demand might go up.

M. F. Benson, purchasing agent, Bryant Heater Co., held it was impossible to say what effect increased steel prices would have. Costs would have to be refigured on the new basis before it would be known whether increased costs could be absorbed.

E. C. Pike, purchasing agent, American Fork & Hoe Co., indicated attempts will be made to absorb increased costs and keep volume of sales high. Raw material costs generally are only a small percentage of the total costs of production of small garden tools and implements, and in low cost items of this type extreme care must be taken to avoid pricing the product out of the market.

DETROIT—It is still too early to determine the probable effect of an increase in steel prices on automobiles and trucks, since the nature and extent of such increments are not yet known. There is at least the hope that sustained high volume production may make possible the absorption of higher material and labor costs, although this is by no means sure. Should the average in steel cost be $5 per ton, then roughly $10 would be added to the

steel bill for the average car, more for trucks. If higher costs make retail price advances necessary, there will be no effect on demand for automotive products, since it continues insatiable regardless of price.

Reflecting higher manufacturing costs one refrigerator maker—Norge—has adjusted prices upward by about $10 on a new model electric refrigerator. This, however, was in advance of reports of higher steel prices.

SAN FRANCISCO—Increases in the price of steel, resulting from the higher cost of coal, are likely to be passed along to consumers by a majority of West Coast manufacturers who use steel in fabricating their products.

A producer of steel barrels, for example, reports that he is now operating on such a narrow profit margin that any further increases in costs, such as a steel price rise, would mean passing along the full amount of the increase to customers.

This manufacturer, however, does not expect buyers' resistance to result from such action. He says that demand for barrels is so great that he can fill only about half of current orders.

Another large West Coast fabricator, producing stampings and parts for other manufacturers, also plans to increase prices in proportion to a steel price increase.

On the other hand, some companies fear that they may be pricing themselves out of a market if quotations on their products go much higher. But if their material costs go higher they see no alternative other than raising price levels.

Typical of this group is a producer of trucks and heavy machinery who reports that its business would be "caught in the middle because of a falling market for its products."

Several companies surveyed state that they will absorb any steel price increases which may be made by mills later this month.

A firm making household appliances, including furnaces, water heaters, stoves, fans, etc., says the shortage of steel, not prices, is the biggest continuing headache. The company is now operating at less than 50 per cent of capacity because of the scarcity of light steel sheets, and is making about half of its water heaters out of aluminum instead of steel. It reports that it has to pay up to 250 per cent over mill prices for sheets, and if it could obtain all its steel needs from the mills it could easily absorb the prospective increase.

A producer of oil well equipment also plans to absorb the increase for the time being. A few months ago it tried to raise prices, but because large factors in the business, with which it competes, did not raise prices, it had to back down. Now it plans to wait until the industry makes a general price increase.

None of the western steel-producing companies has taken any action on price increases on steel as a result of the coal wage boosts and none is expected until new prices are set by bellwethers of the industry in the East. For instance, Columbia Steel Co. will not take any action, either at its West Coast plants or at Geneva, until after its parent, U.S. Steel Corp., announces its policy. That is not expected until after the meeting of U.S. Steel directors on July 29.

Henry Kaiser announced that future price policy at the Kaiser Fontana mill will be determined principally by outcome of negotiations with the Reconstruction Finance Corp. to refinance the loan on the Fontana mill. Mr. Kaiser indicated that although wages and higher costs will affect Fontana's price policies, such effects will be secondary to the RFC action.

STEEL INGOT PRODUCTION STATISTICS

	Estimated Production—All Companies								*Calculated weekly production all companies	Number of weeks in mo.
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
1947	*Net tons	Per cent of capac.	Net tons	Per cent of capac.	*Net tons	Per cent of capac.	*Net tons	Per cent of capac.	Net tons	
Jan.	6,544,841	95.1	384,096	87.7	284,309	65.9	7,213,246	93.0	1,628,272	4.43
Feb.	5,830,371	93.8	314,912	79.6	276,779	71.1	6,422,062	91.7	1,605,515	4.00
Mar.	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
1st qtr..	18,989,581	95.0	1,077,901	84.8	875,312	69.9	20,942,794	93.1	1,628,522	12.86
Apr.	6,360,294	95.4	375,675	88.6	306,844	73.5	7,042,813	93.8	1,641,681	4.29
†May ...	6,634,716	96.4	372,878	85.2	321,903	74.6	7,329,497	94.5	1,654,514	4.43
‡June ...	6,295,137	94.4	351,353	82.9	305,726	73.2	6,952,216	92.6	1,620,563	4.29
‡2nd qtr.	19,290,147	95.4	1,099,906	85.5	934,473	73.8	21,324,526	93.7	1,639,087	13.01
‡1st 6 mos. .	38,279,728	95.2	2,177,807	85.2	1,809,785	71.9	42,267,320	93.4	1,633,835	25.87
1946										
Jan.	3,530,192	51.1	207,512	47.4	135,183	28.9	3,872,887	49.6	874,241	4.43
Feb.	1,301,719	20.9	25,905	6.6	65,058	15.4	1,392,682	19.8	348,171	4.00
Mar.	5,950,241	86.2	363,949	83.1	194,574	41.6	6,508,764	83.3	1,469,247	4.43
1st qtr. .	10,782,152	53.8	597,366	47.0	394,815	29.1	11,774,333	51.9	915,578	12 86
Apr.	5,336,317	79.8	286,088	67.5	238,790	52.8	5,861,195	77.5	1,366,246	4.29
May ...	3,702,184	53.6	153,409	35.0	217,027	46.4	4,072,620	52.2	919,327	4.43
June	5,148,660	77.0	251,253	59.2	225,860	49.9	5,625,773	74.4	1,311,369	4.29
2nd qtr..	14,187,161	69.9	690,750	53.7	681,677	49.7	15,559,588	67.9	1,195,971	13.01
1st 6 mos.	24,969,313	61.9	1,288,116	50.4	1,076,492	39.4	27,333,921	59.9	1,056,588	25.87
July	6,027,388	87.5	365,332	83.6	225,963	48.5	6,618,683	84.9	1,497,440	4.42
Aug.	6,291,363	91.1	373,837	85.4	259,322	55.5	6,924,522	88.7	1,563,098	4.43
Sept. ...	5,951,232	89.2	371,465	87.8	232,869	51.6	6,555,566	86.9	1,531,674	4.28
3rd qtr..	18,269,983	89.3	1,110,634	85.6	718,154	51.8	20,098,771	86.8	1,530,752	13.13
9 mos...	43,239,296	71.1	2,398,750	62.2	1,794,646	43.6	47,432,692	69.0	1,216,223	39.00
Oct.	6,312,604	91.4	387,933	88.6	251,205	53.8	6,951,742	89.0	1,569,242	4.43
Nov.	5,873,264	87.8	318,350	75.1	266,157	58.8	6,457,771	85.4	1,505,308	4.29
Dec.	5,286,799	76.7	222,704	51.0	250,998	53.8	5,760,501	73.9	1,303,281	4.42
4th qtr...	17,472,667	85.3	928,987	71.5	768,360	55.4	19,170,014	82.8	1,458,905	13.14
2nd 6 mos.	35,742,650	87.3	2,039,621	78.5	1,486,514	53.6	39,268,785	84.8	1,494,815	26.27
Total ...	60,711,963	74.7	3,327,737	64.6	2,563,006	46.6	66,602,706	72.5	1,277,382	52.14

• Revised January through December, 1946; † Revised. ‡ Preliminary figures, subject to revision.

For 1947, percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of Jan. 1, 1947, as follows: Open hearth 81,010,990 net tons, bessemer 5,154,000 net tons, electric 5,076,240 net tons, total 91,241,230 net tons. For 1946, percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of Jan. 1, 1946, as follows: Open hearth 81,236,250 net tons, bessemer 5,154,000 net tons, electric 5,500,290 net tons, total 91,890,540 net tons.

B. F. Fairless Defends Coal Wage Settlement

SAN FRANCISCO

Defending terms of the wage increase negotiated between northern coal mine operators and the United Mine Workers, Benjamin F. Fairless, president, U. S. Steel Corp., said the public has been misinformed.

"The contract grants coal miners $1.20 more take-home pay each day, or 15 cents an hour," said Mr. Fairless. "That 15-cent increase merely follows the national pattern of recent wage increases." He termed computations placing the pay increase at 32 or 44 cents an hour as being misleading.

Mr. Fairless said the confusion arose over the reduction in the work-day from 9 to 8 hours. This work-week reduction boosted the hourly pay rate, but it does not mean miners are going to take home that much additional money for each hour worked.

The 44-cent an hour increase published by many newspapers, said Mr. Fairless, is the difference between the old basic rate of $1.18 an hour and the new $1.63 basic rate. "This basic rate is just used for calculations and does not apply to a single coal miner," said Mr. Fairless.

"I think very well of this settlement," said Mr. Fairless, "and I have no apologies. I think it should be welcomed by the nation. I think the best interests of the country are served by continued production rather than by closed coal mines."

Mr. Fairless estimated the increased coal cost at about 75 cents a ton for the northern operators.

Mr. Fairless was in San Francisco only a few hours, passing through here enroute to Honolulu were he is now vacationing.

West Coast Steel Consumers Face Cut in Shipping

Many users are in serious dilemma as Maritime Commission contemplates taking 37 ships from coast run

PACIFIC Coast steel consumers face another dilemma in the contemplated withdrawal from the intercoastal route of 37 freighters due to termination of the Maritime Commission's agreement as of June 30. Many shippers and plant owners on the coast have made a joint appeal that the commission continue to guarantee service.

The situation is serious for steel fabricating plants in the area because the bulk of steel shipments in the past have come by water. If this movement is diverted to the railroads, it will mean not only additional transportation costs but possibly delay due to rail congestion. The situation will be particularly difficult for plants purchasing steel from other than the two large producers who have their own fleets of vessels. The commission is expected to call a hearing soon.

The proprietary lines, including those of the United States Steel Corp. and Bethlehem Steel Co., will continue service while Weyerhaeuser Steamship Co. and the Arrow Line announce regular operations with their own fleets. Other large companies, including Luckenbach Steamship Co. Inc., American-Hawaiian Steamship Co., and McCormick Steamship Division of Pope & Talbot Inc., state they will be compelled to discontinue service because profitable operations are impossible under the bare boat charter terms under which the Maritime Commission is offering government-owned carriers.

ORE STACKER IN OPERATION: Miniature mountains of iron ore are piled up by the automatic ore stacking machine at U.S. Steel's Geneva steel plant, Geneva, Utah. On the right, ore is seen running off one of the twin booms of an ore stacker. At the left is part of the skyline of the 1500-acre steel plant. The electric stacker is used to pile iron ore so that when the reclaimer cuts cross sections the result will be a blend averaging 52 per cent iron

Southern California May Receive Coke from Texas

Hope is high among coke users in southern California that serious shortages in foundry grades will be relieved soon with the beginning of substantial shipments from the Daingerfield, Tex., blast furnace.

While officials of Brumley-Donaldson Co., Los Angeles, West Coast agents for the furnace installation's output in pig and coke, have as yet made no official statement as to the date of initial consignments, it is understood that first test carloads will arrive here within the next 30 to 40 days.

Reliable sources believe that only small quantities of pig iron will actually be shipped to the Coast, due to high freight rates, nearly double the rates in force from Geneva and from Fontana.

While most of the iron from Daingerfield will go to midwest and eastern points, it is felt that nevertheless pressures will be relieved on the West Coast in similar ratio in that west-produced pig will be sold in greater quantities in the West than heretofore.

Much of the coke now available sporadically in southern California is the beehive variety being shipped from Pennsylvania.

A. J. Smith Engineering Buys Two Firms for $4,500,000

McAlear Mfg. Co., Tulsa, Okla., and Climax Engineering Co., Clinton, Iowa, both divisions of General Finance Corp., Chicago, have been purchased for a reported $4,500,000 by A. J. Smith Engineering Co., Kansas City, Mo.

Purchase includes all physical assets of the two companies, including names and good will, but not liabilities. The McAlear firm, purchased by General Finance in 1943, manufacturers control equipment for liquids, vapors and gases and equipment to control pressures, flow and temperatures for liquefied petroleum gas systems.

Climax Engineering makes a complete line of oil field engines, farm machinery, electric fans, lighting plants and liquid pumping units.

Say Western Gray Market In Steel Exaggerated

Los Angeles warehousemen are crying down insinuations brought out before a Senate subcommittee hearing investigating the "gray market" in steel in the area. The insinuations were that large amounts of steel in general were being sold at far above market prices throughout southern California.

Actually, a prominent warehouse executive said, virtually the sole shape being peddled in subrosa fashion are sheets. Even on this item, gray market transactions have been relatively few, he declared.

"No differentiation was made by the senators between steel in general and sheets in particular," he said. "Hence public announcements led the public to believe that the gray market is general. Nothing could be farther from the truth. Los Angeles warehouses have plenty of steel, except for some sizes of sheets."

Domestic Appliance Group Told Tight Sheet Supply May Continue

Steel company executive tells summer meeting of American Washer & Ironer Manufacturers' Association it is questionable if 1948 and 1949 output will meet demand. Cost of materials held to represent half of appliance selling prices

DELEGATES to the summer meeting of the American Washer & Ironer Manufacturers' Association, held at Mackinac Island, Mich., last week were told that it is questionable whether estimated sheet and strip steel output totalling 19,500,000 tons in 1948 and 20,600,000 tons in 1949 will meet demand.

The opinion was voiced by R. C. Todd, vice president, American Rolling Mill Co., Middletown, O., who addressed the 300 executives in attendance at the meeting.

Severe shortages of sheet steel have been hampering production of household washers, dryers and ironers, though output in units is more than double that of 1946.

Current production of sheet and strip is at the rate of 17,800,000 tons per year, almost 30 per cent of all steel being shipped and an increase of 25.9 per cent over 1946 production, Mr. Todd asserted.

Discussing prices, Mr. Todd declared that before the recent coal wage advance, "commodity grades of steel sheets sold at $7 to $10 less than what they were able to contribute toward profits in 1940 and 1941. Now, with coal up 80 cents a ton, probably creating another increase of $2 a ton in the cost of steel, it is uncertain how far selling prices should advance."

New Type Purchasing Agent Appears

Today's competent purchasing agent is a specialist in vendor relations, Arthur G. Pearson, director of procurment, American Meat Institute, Chicago, declared, addressing a special session at the convention. Mr. Pearson said the "errand boy" purchasing agent is fast vanishing.

Cost of materials in household washers, dryers and ironers is approximately one-half of appliances' selling price today, Carl L. Huff, vice-president, Bliss & Laughlin, Harvey, Ill., and chairman of a committee representing 40 suppliers who are associate members of the organization, told the association.

"If you give your old established sources the opportunity of reviewing your individual unit production costs, you will find vast engineering service maintained for you by your suppliers, a complete specialized organization for every item going into your finished product," he said. "Many suppliers' representatives in this industry are qualified engineers."

"Competition demands that every manufacturer know where his merchandise is going, that he know where his competitor's products are going and that he also know where the buying potential is greatest and where it is weakest," H. A. Toussaint, vice president and general manager of the American Ironing Machine Co., Algonquin, Ill., told the delegates. Speaking as chairman of the Advertising & Marketing Research Committee, he urged the manufacturers to report their sales by more than 600 market areas instead of by states, as at present, and recommended that a special conference of the association's sales managers be held within 60 days to approve sales analysis methods for general adoption by the members. Serving with Mr. Toussaint on the committee are: W. F. Linville, Bendix Home Appliances Inc., South Bend, Ind.; J. W. Stigall, F. L. Jacobs Co., Detroit; W. H. Reeve, Easy Washing Machine Corp., Syracuse, N. Y.; F. W. McGrath, Appliance Mfg. Co., Alliance, O.; P. J. Daniels, Barlow & Seelig Mfg. Co., Ripon, Wis.; M. A. Aasgaard, Young Corp., Fall River, Mass.; Lloyd Hertzler, General Electric Co., Bridgeport, Conn.; W. A. Friedrich, Hamilton Mfg. Co., Two Rivers, Wis.; and William Shaw, public relations expert of the association.

DIVERSIFICATION

Because of increasing diversification in the home laundering equipment industry with attendant multiplication of engineering, production and marketing problems, the American Washer & Ironer Manufacturers' Association, now in its 31st year, will undergo a sweeping reorganization. Hereafter industry activities will be under direction of four closely integrated product divisions directly serving the automatic washer, conventional washer, dryer and ironer manufacturing groups.

Of 46 manufacturers constituting the industry, 34 make large and small washers and 6 small washers only; 10 make dryers and 18 ironers. Washer manufacturers marketing an automatic washer, or planning to introduce one, total 14. Manufacturers point out 40 suppliers sell to the factories 115 materials, parts and equipment items in close to 400 types and styles.

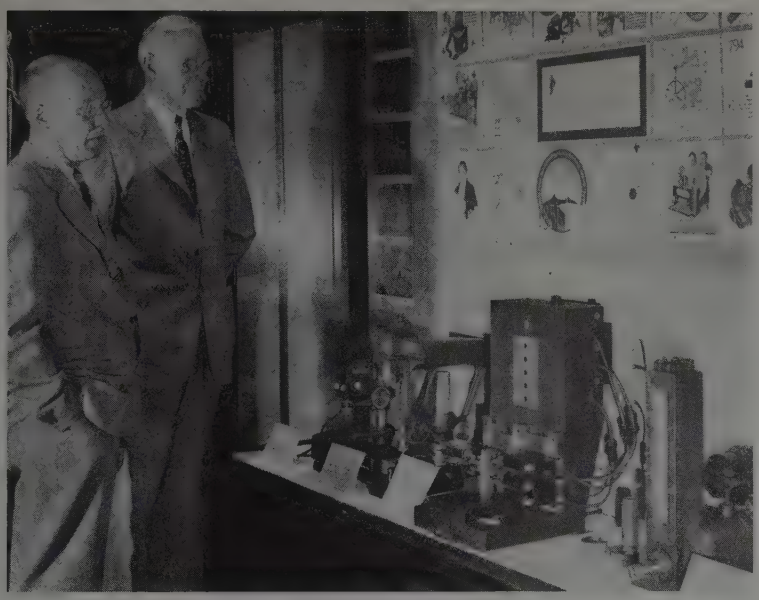
Currently household washer output is at the rate of 3,500,000 units annually. Dryer and ironer output is also at record level.

The Government Activities Committee of the association will continue to work for exemption of household laundering equipment sales from the provisions of regulation "W," William S. Hammersley, chairman, announced at the meeting. The Senate Banking Committee on July 11 approved legislation extending controls on consumer installment buying through Dec. 31, but provided for less restricted credit terms. Mr. Hammersley, general sales manager of the Domestic Division, 1900 Corp., St. Joseph, Mich., said the committee has petitioned Marriner S. Eccles, chairman of the board of governors of the Federal Reserve System, has made known the details of the petition to those members of Congress representing the states in which the industry's members operate as manufacturers, and also has presented the petition having to do with consumer credit. Serving with Mr. Hammersley are Fred M. Mitchell, manager, Laundry Equipment Division, Frigidaire Division, General Motors Corp., Dayton, O., and H. L. Clary, Norge Division, Borg-Warner Corp., Detroit, Mich.

Cost Analyses Planned for Group

G. W. Yeager, treasurer, Dexter Co., Fairfield, Iowa, chairman of the organization's Cost Accounting Committee, announced plans for perfecting a method by which industry-wide cost analyses may be compiled for the information of all members. Serving with Mr. Yeager on the committee are: A. G. Nelson, Horton Mfg. Co., Ft. Wayne, Ind.; C. E. Spoerl, Hotpoint Inc., Chicago; H. A. Angier, Conlon Division, Conlon-Moore Corp., Chicago; John Park, Norge Division, Borg-Warner Corp., A. H. Labisky Jr., Barton Mfg. Co., West Bend, Wis., and W. J. Reuscher, Bendix Home Appliances Inc., South Bend, Ind.

Use of counterfeit parts in repairing or rebuilding household washers by irresponsible dealers is one of the problems to be considered by a new Parts & Service Committee of the association, it was revealed in a report prepared by C. L. Atkinson Jr., sales service manager, Easy Washing Machine Corp., Syracuse, N. Y. Serving with Mr. Atkinson on this committee are: T. F. Robinson, Automatic



HISTORY OF MEASUREMENT: Smithsonian Institution officials in Washington report an exhibit of early models of Sheffield Corp. (Dayton, O.) precision measuring instruments and a pictorial history of measurement is attracting considerable attention. Carl Mitman, left, head curator of engineering and industries, and Dr. Alexander Wetmore, secretary of the Smithsonian are shown viewing the display

Washer Co., Newton, Iowa; F. W. Buelow, Barlow & Seelig Mfg. Co.; A. P. Smith, Bendix Home Appliances Inc.; F. E. Yenny, Ironrite Ironer Co., Mt. Clemens, Mich.; A. B. Murray, Maytag Co., Newton, Iowa; and R. A. Simmons, 1900 Corp., St. Joseph, Mich.

The men who manufacture household washers, dryers and ironers are in a hot race to make their products do an even better job for the American housewife, plans of the industry revealed at the meeting show. Each member of the association now uses a standard "comparator" washer by which he is able to compare the washing performances of all models, and to design changes in his own if they are found not to equal others of similar price and capacity.

Industry-wide comparison soon will be extended by introducing a basic method for gaging the removal of water from washing in the various wringing processes, G. I. Cockerill, chairman of the association's engineering and research committee and chief engineer of the Apex Electrical Mfg. Co., Cleveland, announced. A standard method by which manufacturers can compare their automatic indoor washing dryers also is being prepared, he reported. Water-removal is being studied by a special subcommittee under Frank Breckenridge, chief engineer, Automatic Washer Co., Newton, Iowa, and dryers, by a subcommittee headed by C. S. O'Neil, head of the research engineering division of the Hamilton Mfg. Co., Two Rivers, Wis.

Co-operating with the American Institute of Architects, the committee is working for eventual "modular co-ordination" in kitchen and utility room planning.

Engineering and research studies of the association are in the hands of its largest committee. It includes, also, P. Eduard Geldhof, 1900 Corp.; N. L. Etten, Chamberlain Corp., Waterloo, Iowa; W. F. Oliver, Bendix Home Appliances Inc.; G. D. Conlee, Conlon Division, Conlon-Moore Corp; T. R. Smith, Maytag Co.; H. J. Mertz, Beam Mfg. Co., Webster City, Iowa; H. E. Metz, Landers, Frary & Clark, New Britain, Conn., and J. B. Dyer, Easy Washing Machine Corp. Dave Hays, president, Preventative Maintenance Co., Bridgeport, Conn., is special consultant to the committee.

Escalator clauses in purchasing contracts which contain open price adjustment provisions are dangerous, and "a contract calling for 'price at time of delivery' is a blank check for the vendor," round table participants agreed in a discussion of current management-purchasing problems at the final session of the meeting.

Purchasing agents, suppliers and top management with the home laundering equipment industry turned in 163 questions on the mutual problems of management and procurement.

Builders Rush To Complete New Machine Tools

Feverish activity in engineering and experimental departments points up newness of many models to be displayed

FOLLOWING the lead of the hundreds of metalworking companies which shut down plants completely for vacation periods early this month, numerous machine tool builders also closed large sections of their production facilities in anticipation of the slackened demand for tools. However, in those machinery-building plants which furloughed their production employees, engineering and experimental department staffs were working around the clock to bring out new machines in time for the September Machine Tool Show.

The almost superhuman efforts of tool builders to complete new models in time for the show belies reports that many of the new devices to be shown at that time will be only redesigned prototypes of older models or will consist only of new attachments for old machines. In fact a survey of eastern machine tool builders reveals that the majority will have machines on the floor of the Dodge-Chicago plant which are completely new from the floor up.

How successful machinery manufacturers are in their efforts to get new tools ready for the show is indicated in the statement by the show's sponsor, the National Machine Tool Builders' Association, that the number of machines to be exhibited—now set at 2000—is double that originally planned.

One of the largest automobile producers in Detroit, to persuade tool builders not to hold new model machines off the market until the show, has sent letters to machinery makers stressing the company's need for higher speed metalworking machinery now. This plea will be heeded, but much of the new machinery cannot possibly be ready for the trade before the show's opening date.

Should steel prices be increased to the extent thought necessary as a result of the higher coal costs, machine tool builders will be hard pressed to keep their prices at current levels. In fact many of those companies which increased their prices in June because of higher labor and raw material costs may find it necessary to raise prices again. Other builders, who withheld price increases at that time, are of the belief that upward revisions may be necessary when higher costs for steel and castings begin to be felt.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Manufacturers' cost data, given to OPA in confidence, may be available to "researchers" in National Archives. Business men fear competitors may obtain intimate cost information. Tightening of restrictions sought

A HORNETS' nest has been aroused in Washington as a result of fears among manufacturers that cost secrets which they imparted to the Office of Price Administration as late as last year will lose their confidential status. This situation has been precipitated by a letter from the National Archivist to all interested government departments and agencies. It advises that the files of the defunct OPA, soon to be cleared to Archives by the Commerce Department, will be available to research workers and economists. They may not associate any information with the companies that filed the reports, nor divulge the identity of these companies but may freely publicize any conclusions they derive from their study of OPA material.

Many companies, it will be recalled, gave their cost data to the OPA under protest, in the fear that the seal of confidence under which they supplied it might be violated. They recalled that much information given originally to the government in confidence—as figures in individual income tax returns—soon are handed on to the public. Now they see the threat that their competitors will learn from the highly confidential OPA reports the prices they pay for castings, forgings, stampings, antifriction bearings, electric motors and other parts.

Records Seen Available to Anyone

The stipulation of the National Archivist that data may not be publicized with the name of the company, they feel, is no protection whatever. Any manufacturer can retain a research organization to do a research job for him on the OPA records. Under one guise or another it would be easy for a manufacturer to get one of his own cost experts in National Archives for that purpose.

Up to the moment interested manufacturers see no remedy for the proposed opening of the secret OPA files. Both the National Archives Act and the Price Stabilization Act contained guarantees that confidential information furnished to National Archives or OPA must be treated as confidential; but National Archivist sees in his policy no violation of these provisions.

A move now is under way to get the Senate to tighten up the provisions of H. R. 1350 recently passed by the House. This bill has a provision that the head of a liquidating agency transferring that agency's records to National Archives shall instruct the Archivist as to the extent to which the records are to be treated as confidential. The bill now is pigeonholed in the Senate Civil Service Committee and interested manufacturers are trying to get it revised so as to keep competitors, labor union economists and other researchers from having access to their private cost data. So far Senate Civil Service has taken no action.

In some quarters it has been said that the threat probably will come to nothing because of the likelihood that it may take the small National Archives staff months —maybe years—to tackle the OPA files. Only recently the staff started to work on the NRA files. However, reliance on such protection is apt to be illusory because many researchers in Washington have ways and means of short-cutting government red tape. Labor union representatives are especially successful in getting action in a hurry.

As a foretaste of what may come, the Government Printing Office now is publishing 14 industry surveys prepared prior to liquidation by the OPA staff from basically confidential reports. These can be ordered from the Superintendent of Documents, Washington 25, at 10 cents per copy. They are being published under the title "OPA Economic Data Series." They set forth the costs and profit margins in each of the covered industries on the basis of the confidential reports of individual companies in the industry, although without identifying any of the companies.

The first of the surveys, No. 1 in the series, covers the bituminous coal industry from August of 1943 through December of 1946. Not yet in print but due to come out in August is a survey of production costs and profits for "selected carbon steel products" for the nine months ended Sept. 30, 1944. Other industries that will be covered by similar surveys include fisheries, men's haberdashery, lumber, automobile dealers, meat, anthracite and others.

New Government Patent Policy

When the President's Executive Order 9865 made its appearance last month it was hailed by a good many patent men as another administration move toward broader government ownership or control of patents. Preliminary checks reveal no evidence for this fear. The order merely calls on government departments and agencies to report those government-held inventions that should be patented abroad. Such a move, the order pointed out, is advisable to protect the many United States industries that operate under government-owned invention. The purpose is to protect such manufacturers against foreign competition based on low wages.

The order results from conversations that resulted from the recent patenting abroad of new anti-malarial remedies developed by a number of drug manufacturers under contracts with the Office of Scientific Research & Development. Under the OSRD policy all United States manufacturers so desiring were permitted to produce these medicines under non-exclusive, royalty-free licenses. Under this arrangement a number of manufacturers are doing a very profitable business; while they are satisfied to compete against each other, they became afraid of what might happen if foreign manufacturers might later be in a position to use these same inventions but at much lower costs due to lower hourly wages abroad.

Advisory Committee Designated

They took the matter up with Dr. Vannevar Bush. He designated an industry advisory committee. As a result, the government has applied for patents abroad, but the industry is footing the bill.

This incident raised the question as to why it was that the United States always has followed a policy of failing to apply for foreign patents on government-owned inventions—a policy which is sharply in contrast with the large volume of applications that come to Washington right along from the governments of Great Britain, France and other countries.

Administration of the new order has been entrusted by the Secretary of Commerce to John C. Green, director of the Office of Technical Services, Commerce Department. As a preliminary step, Mr. Green has asked all government departments and agencies to give him lists of government-owned inventions, with recommendations as to those on which patent applications shall be filed abroad.

"But the best source of information," Mr. Green told STEEL, "will be the interested United States manufacturers. They are familiar with the government-owned inventions in their industries and

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know the value of those inventions. We are going to have to rely largely on our manufacturers for advice as to what government-owned inventions should be patented in foreign lands in order to protect United States wages and costs. We now are planning on ways and means of getting this message over to American industry, so as to obtain its co-operation. We in the government will have to have such co-operation in full measure if we are going to do this job."

The plan of procedure after the OTS gets recommendations as to what inventions should be patented abroad calls for the appointment of advisory committees representing the industries involved. Those committees will be invited into conferences in Washington to outline plans of action.

While the Commerce Department will furnish direction and supervision over this new government activity, Mr. Green went on, the cash expenses will have to be defrayed by the interested industries. Commerce Department, he pointed out, has no appropriation out of which it could pay the expense of patenting government-owned inventions in foreign countries. Opinions he has received so far indicate that there should be no trouble over this detail; it is believed the American manufacturers in many cases will feel that the expense of obtaining foreign patents will be a small consideration in view of the protection to be gained.

Vinson-Trammell Act

Old-timers in Washington who recall the charges of gross profiteering that led to enactment of profit limitations in the Vinson-Trammell Act of 1934—10 per cent on naval vessels and 12 per cent on aircraft—were much interested in the House Armed Services Committee finding that this restriction had proven a dud. Rep. Paul J. Kilday (Dem., Tex.), ranking minority member of the subcommittee that studied the matter, explains as follows:

"The Vinson-Trammell Act provided a ceiling limitation on profits on naval vessels and also on aircraft construction, but not on any other industry. It has been found to be impracticable.

"Specifically, it has not been regarded as providing an inadequate profit but it has served to operate as a minimum, as such things generally do. When you have provided that the maximum profit shall be 10 per cent, it is ordinary for that to be regarded as the minimum profit, and contracts have been made accordingly. It has been found that because of accounting procedures required under the Vinson-Trammell Act the action costs the government money rather than saves money."

NEW CHIEF JUSTICE OF U.S. COURT OF CLAIMS: Chief Justice of the United States Fred M. Vinson, right, administers the oath of office to former congressman Marvin Jones, left, of Texas, who recently became Chief Justice of the U.S. Court of Claims. Witnessing the ceremony is Attorney General Tom Clark. NEA photo

Having passed the House, H. R. 3051, which repeals these profit ceilings, now is before the Senate. Army and Navy procurement officers who testified before the House subcommittee declared they could make the government's money go farther without these profit restrictions.

New Attack on Spending

The economy-minded leadership in Congress frankly is disappointed with its record to date of reducing government spending. As soon will be made clear, after the Senate gets through restoring House cuts in appropriation bills, the reduction in spending will be far less than was anticipated at the beginning of the current session. The newly created Commission on Organization of the Executive Branch of the Government has the assignment of uncovering opportunities to make deeper cuts next year.

The sole purpose of this commission, Speaker Martin of the House told a news conference, is to "to seek out and report federal expenditures that can be eliminated or reduced. Coupled with this objective is the intention of returning to the states, counties, municipalities, private business and the individual citizens those functions which they can best perform for themselves but which have been assumed or usurped by the federal government at some time in the past 14 or 15 years.

"This is going to be a painful process. There will be loud, long and numerous cries of anguish from the bureaucrats who get cut out of their good salaries and soft jobs. But the operation must be performed for the benefit of the financial health of the American people . . . With the information that the new commission will unearth, the Appropriations Committees of the House and Senate should be able with greater accuracy to cut the government down to peacetime size."

Establishes Import Priorities

Brazil has established a schedule of priorities for which foreign exchange will be allocated, in which iron and steel products and machinery, industrial equipment, as well as finished heavy goods, are included in the first priority category.

Large and small bars, joints, sheets and plates of iron or stainless steel, sheets, bars, bar beams of carbon steel, steel rails, and other track equipment, electrolytic tin plate and leaded sheets are among the products favored. Also included are tubes of iron and steel, all types and dimensions, galvanized wire, barbed wire, wire screen, carpenter tools, ferroalloys except ferromanganese, ferrochrome, or ferrosilicon. Metalworking machinery and industrial equipment of many categories also are included in the preferred category, according to the Brazilian announcement.

Labor Board Issues Instructions For Disposal of Wagner Act Cases

NLRB has 5100 complaint cases pending in regional offices. Revisions in National Labor Relations Act necessitates changes in procedure. New rules and regulations, conforming with new law, to be promulgated soon

NATIONAL Labor Relations Board, preparing to start enforcing the National Labor Relations Act as amended by the Taft-Hartley law, has issued instructions to regional offices on how to dispose of the 5100 complaint cases pending under the old (Wagner) law at the time the new measure was enacted.

Many provisions of the new labor law become effective Aug. 22. The NLRB is now working on new rules and regulations for enforcing these provisions. The new regulations are expected to be released early in August.

Instructions to the 21 regional boards for current handling of unfair labor practice and election cases before Aug. 22 are summarized as follows:

Unfair Labor Practice Cases: (1) Complete all current hearings.

(2) Re-examine immediately all cases in which complaints have issued but in which hearings have not yet started. If the alleged violations also constitute illegal conduct under the act as amended, proceedings may go forward into hearings as scheduled. All other cases should be submitted to the Washington office of the board with recommendations.

(3) All future complaints are subject to the provisions of item 2.

(4) Serve immediately upon parties exact copies of all charges and amended charges. (Public Law No. 101, Sec. 10 (b) states: " * * * No complaint shall issue based upon any unfair labor practice occurring more than six months prior to the filing of the charge with the Board and the service of a copy thereof upon the person against whom such charge is made * * * .")

(5) Employer charges of unfair labor practices should not be accepted until the effective date of the amendments to the act.

(6) Similarly, action on requests by unions for injunctions should not be taken before the effective date.

Election Cases: (1) Dismiss immediately all petitions seeking certification of units involving supervisory employees. (Public Law No. 101, Sec. 2 (3) states: "The term 'employee' * * * shall not include * * * any individual employed as a supervisor.")

(2) No further pre-hearing elections shall be scheduled.

(3) Pre-hearing elections in which notices of election have issued may be concluded, unless categories of employees otherwise excluded by the amendments are involved. In the latter event, advice from the Washington office should be sought by the regional director.

(4) Continue to conduct hearings subject to the following: (a) Clear all cases involving units of guards. (Public Law No. 101, Sec. 9 (b) (3) states: "The board shall not * * * decide that any unit is appropriate for such purposes (of collective bargaining) if it includes, together with other employees, any individual employed as a guard * * *; but no labor organization shall be certified as the representative of employees in a bargaining unit of guards if such organization admits to membership, or is affiliated directly or indirectly with an organization which admit to membership, employees other than guards.")

(b) Make a complete record in craft unit cases. (Public Law No. 101, Sec. 9 (b) (2) states: "The board shall not * * * decide that any craft unit is inappropriate for such purposes (of collective bargaining) on the ground that a different unit has been established by a prior board determination, unless a majority of the employees in the proposed craft unit vote against separate representation.")

(c) Make a complete record as to professional employees. (Public Law No. 101, Sec. 9 (b) (1) states: "The board shall not * * * decide that any unit is appropriate for such purposes (of collective bargaining) if such unit includes both professional employees and employees who are not professional employees unless a majority of such professional employees vote for inclusion in such unit.")

(d) Upon completion of the hearing, the hearing officer shall submit to the board an analysis of the record. He shall not make any recommendations. (Public Law No. 101, Sec. 9 (c) (1) states: "* * * Hearing may be conducted by an officer or employee of the regional office, who shall not make any recommendations.")

(5) Complete the conduct of cross-checks provided for by any existing agreement of parties. (The cross-check, as permitted under the NLRB, is a device whereby the union and a company agree to resolve the question concerning representation by a check of employee designation of the union as bargaining representative against the company payroll.)

(6) Approval shall be withheld from any further such cross-check agreements. (Public Law No. 101, Sec. 9 provides that questions concerning representation shall be answered through election.)

(7) In the conduct of elections, immediate compliance should be made with Sec. 9 (c) (3) of the law as amended. (The text of this section of Public Law No. 101 follows: "No election shall be directed in any bargaining unit or any subdivision within which, in the preceding 12-month period, a valid election shall have been held. Employees on strike who are not entitled to reinstatement shall not be eligible to vote. In any election where none of the choices on the ballot receives a majority, a run-off shall be conducted, the ballot providing for a selection between the two choices receiving the largest and second largest number of valid votes cast in the election.")

(8) Petitions for de-certification of certified bargaining representatives, employer petition for a collective bargaining election when he has been confronted with a union claim of majority representation and petitions for union security votes shall not be accepted until the effective date of the amendments to the act.

Chevrolet Will Build Parts Plant in Cleveland Suburb

Plans for construction of a new Chevrolet parts fabricating plant in Parma, O., Cleveland suburb, have been announced by Nicholas Dreystadt, Chevrolet general manager and vice president of General Motors Corp.

Site of the plant will be a 40-acre tract where Chevrolet had earlier planned to build a $67 million assembly plant. Those plans were indefinitely deferred last May.

Construction on the new unit, which will occupy 1,325,000 sq ft of floor space, will begin immediately, Mr. Dreystadt said.

When in full scale operation the plant will employ about 5000.

Barium Steel Buys George King Co. in Sheffield, Ala.

Barium Steel Corp., New York, has purchased the plant and other physical assets including inventories and good will of George King Co. Inc., producer of iron and steel castings at Sheffield, Ala.

This marks the entrance of Barium into the southern industrial field.

British Steel To Get More Coal In This Quarter

Increase of 10 per cent in fuel ration not expected to have much effect on steel deliveries for some time to come

BIRMINGHAM, ENGLAND

INTRODUCTION of the five-day week into the coal industry some time ago temporarily brought a spurt in production and encouraged the steel industry considerably. More recently, however, coal output has dropped and in some areas absenteeism has increased. The steel industry, nevertheless, has been promised an increase of 10 per cent in the allocation of fuel for the third quarter, but it will be some time before increased rations will affect steel deliveries.

Although the shortage of steel is adversely affecting all industry, the shipbuilding industry in particular has been hard hit, and for this reason the outlook for the Northeast Coast is more disquieting that it has been for some time. One of the difficulties is that foreign companies, anxious to place orders for ships, are disgruntled at the delays in delivery and the impossibility of securing firm dates for contracts they are desirous of placing. The year's target for the industry was to have been a million and a quarter tons of completed vessels, but this has been written down to less than a million tons.

More Freight Cars Needed

A larger supply of freight cars is urgently needed, and builders are committed to substantial contracts for rolling stock for both the domestic and export markets. The principal handicap to increased output, as in the case of shipbuilding, is the steel shortage, notably in sheets and plates for which mills are heavily overloaded.

Good progress is being made in the automobile industry, although the high prices in the used car market indicate the number of cars reaching distributors for the home trade is still comparatively small. Some time ago the industry was requested by the government to raise its quota of cars for export. The industry has responded with an increase in the export quota from one-half to three-fifths of total output. May output of 27,496 motor vehicles and chassis was a postwar record only 1000 below the corresponding 1938 figure, and the number of commercial vehicles—14,301 —was an alltime record. It is estimated the number of cars available to the home market in the future will be around 10,000 as compared with 22,500 a month in 1938, but this output can only be achieved by increasing the supplies of raw materials.

MACHINERY TO MAKE GERMAN LENSES: Efforts are being made to get the Carl Zeiss Works, at Jena in the Russian-occupied zone of Germany, back into production of camera lenses with the use of about 1000 old machines, all that remain of an original total of 10,000. The Soviets, who seized most of the equipment for reparations, are allowing a limited production of lenses for civilian use only. NEA photo

Steel rerollers are handicapped by lack of semifinished steel, particularly billets and bars, but are hopeful that by the end of the year more American steel can be imported. From January through May, 1947, the tonnage of all classes of iron and steel imported has come principally from the Empire and totals 244,144 tons as compared with 179,490 in the corresponding period of 1946.

Little progress is being made in supplying sufficient pig iron for the foundry industry. Production is still inadequate and although a new blast furnace on the Northeast Coast is nearing completion, it is understood the entire output is scheduled to go into production of steel, whereas the urgent need is for high phosphorus iron for production of light castings. The makers of these products are granted licenses for iron, but are unable to obtain even the tonnage sanctioned by these permits.

A slight increase in production is evident in the tin plate mills in South Wales, output of which is now at the highest level since the beginning of the war. Export demand is substantial, both for tin plate and for black and galvanized sheets.

Financial arrangements for the £60-million project for modernizing the steel industry have been virtually completed. Last week an issue of £15 million in 3 per cent first mortgage debenture stock in Steel Co. of South Wales was made. The rest of the capital will be put up by the government's Finance Corp. for Industry. Largest contracts in the modernizing project go to the United States with United Engineering & Foundry Co., Pittsburgh, receiving orders worth $17,407,678.

Argentina Becoming Better Customer for U.S. Products

Argentina will become an increasingly good customer for American heavy goods, according to C. Alonso Irigoyen, former Argentina finance minister, who will fly shortly to Buenos Aires to lay plans for an extensive survey of foreign trade potentials among the American republics.

As president of C. Alonso Irigoyen & Co. Inc., New York, importing and exporting firm, Mr. Irigoyen sees "expanding business opportunities for American exporters because the republics below the Rio Grande are prepared more and more to orient their foreign trade along longitudinal rather than latitudinal lines."

Mr. Irigoyen said that Argentina is in the market for American goods as "she has gradually changed from an agrarian to an industrial nation. More-

over with a growing population and an expanding economy, Argentina can become one of the best customers of the United States."

He also pointed out, however, that foreign trade must work both ways and that, however willing American republics are to import from the United States, they cannot long do so unless they are able to realize, through exports to the United States, the dollars with which to pay for the goods imported.

Government Delays Action On Two Foreign Pipelines

Pending a decision by the U. S. State Department, action on applications for two foreign pipelines is being held up by the Office of International Trade. Both are for Saudi Arabia.

One is for a 50-mile line of 20 and 22-in. pipe and calls for 13,300 tons of steel which is wanted for shipment prior to the end of 1947. This line is to be built by the Arabian-American Oil Co., jointly owned by the Standard Oil Co. of California and the Texas Co.

The other calls for 240,400 tons of steel for approximately 1000 miles of 30 and 31-in. pipe for shipment starting in the fourth quarter of 1947 and stretching through the first quarter of 1949. This line is to be erected by the Trans Arabian Pipe Line Co., owned by Standard Oil of California, Standard Oil of New Jersey, Socony-Vacuum Co. and the Texas Co.

Korea Opened to Limited Number of Traders

Following close on the decision to reestablish private trade with Japan, General MacArthur's SCAP (Supreme Command Allied Powers) has decided on similar action with reference to Korea.

Starting July 15, a limited number of traders were permitted to enter that country for trade purposes. They may purchase goods which Korea has available for export, sell raw materials required by Korean industry, or sell commercial services such as insurance and shipping.

Report Describes German Household Refrigerator

An adsorption type household refrigerator developed in Germany just before the war is described in a report placed on sale by the Office of Technical Services, U. S. Department of Commerce.

The refrigerator uses solid calcium chloride as the adsorbent, ammonia as the refrigerant, and stove gas as the heater fuel. Its operation is automatic.

Steel Ingot Production in Sweden Drops During First Quarter of 1947

Output of 310,000 tons compares with 350,000 tons in corresponding period of 1946. Through an agreement with Austria, that country will deliver 7400 tons of iron and steel products into Sweden during the next six months

OUTPUT of steel ingots in Sweden during the first quarter was 310,000 tons, compared with 350,000 tons in the corresponding period of 1946. Through an agreement with Austria, that country will deliver 7400 tons of iron and steel products into Sweden in the next six months. Russia and Sweden are reported to have signed an agreement covering trade with the Russian zone in Germany. According to the terms, Sweden would receive electrical equipment, chemicals, cement, etc., and would export to the Russian zone machinery and equipment and iron and steel products. Payment would be made in dollars. A similar agreement has reportedly been made with the Anglo-American zones.

Italy

Prospects for the Italian foundry industry are improving, supplies of raw materials, including pig iron from United States, Mexico and Brazil, becoming more plentiful. Negotiations are being carried out with Russia for exchange of pig iron from Russia for heavy machinery from Italy. Output of steel in Italy during April was 140,000 metric tons, against 117,000 tons in March.

Russia

Reports indicate that orders have been given to collect 2 million tons of scrap in the Russian zone of Germany. The current five-year plan calls for development of the heavy industries in the Kuzbas region, more than 1000 miles east of the Ural mountains. In 1947 this district is expected to produce 15 per cent of the Russian output of pig iron, 16 per cent of its steel output and 20 per cent of the country's rolled products.

The Netherlands

Rolling mills of the Royal Netherlands blast furnace and steelworks have resumed production, using equipment brought back from Germany at the end of 1946. The mills will produce plates, particularly for shipbuilding, at the rate of 170,000 tons per year when in full production, but they will start at a rate of 60,000 tons.

Iron and steel imports into the Netherlands in April were 61,300 tons, compared with 43,000 tons in March. They consisted mainly of merchant bars, structural steel, hoops and plates and sheets.

Germany

For the first four months of this year the output of pig iron and ferroalloys in the British zone was 537,471 tons, and the production of steel ingots and castings was 755,563 tons. It was expected that the output of steel would be less than 200,000 tons per month because of the reduction of coal supplies from 500,000 tons to 400,000 tons per month which took place in the British zone last spring.

Czechoslovakia

April exports from Czechoslovakia included 32,740 metric tons of iron and steel products, mainly steel pipes, merchant bars, plates and sheets and wire products. There was a slight reduction of output in April as compared with March. The figures for April and March were: pig iron 115,689 and 122,458 metric tons; steel ingots and castings 224,211 and 231,631 tons; rolled products 138,131 and 143,552 tons.

It is reported that the Skoda works at Pilsen is opening a locomotive shop with an annual capacity of 200 locomotives.

Hungary

The output of pig iron in Hungary averages 22,600 tons at the State works. At present this is on a basis of 80 per cent of the prewar production.

Developments in Swiss Coal Utilization Noted in Report

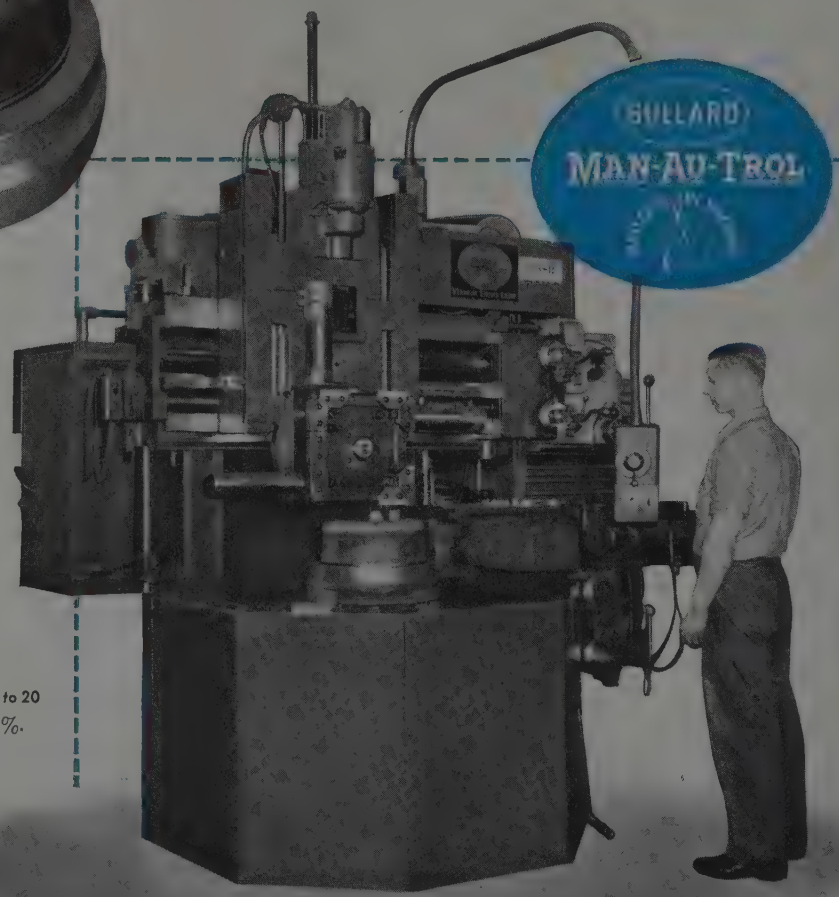
Recent developments in Switzerland for the more efficient use of coal in gas turbines and steam generators are described in a publication recently released by the Bureau of Mines.

Concerned largely with wartime improvements and advances made under the impetus of a coal shortage in neutral Switzerland, the report was prepared by Dr. H. J. Rose, vice president and director of research, Bituminous Coal Research Inc., who visited that country late in 1945 as a member of the Solid Fuels Mission of the Technical Industrial Intelligence Committee.

Leading manufacturer of construction equipment reports:

Cast Iron Drive Wheels Machined 5 Times Faster on a BULLARD Man-Au-Trol V.T.L.

No other machine offers such a cost-lowering combination of productivity, versatility and accuracy as a *BULLARD* Man-Au-Trol Vertical Turret Lathe. Bulletin MAV-G-1 tells you why. Write for your copy today. THE BULLARD COMPANY, Bridgeport 2, Connecticut.



Here are shown before and after shots of a cast iron drive wheel for a Motor Grader, machined on a 30" *BULLARD* Man-Au-Trol Vertical Turret Lathe by Austin-Western Company, Aurora, Illinois. The former method, employing *two machines*, took *1 9/10 hours*. On the *BULLARD* Man-Au-Trol V.T.L., *actual cutting time was reduced to 20 minutes*... a time saving of 82.4%.

BULLARD CREATES ***NEW METHODS*** TO MAKE MACHINES DO MORE

By A. H. ALLEN Detroit Editor, STEEL

Mirrors of Motordom

General Motors shutdown for lack of steel threatens attainment of 5 million car goal for 1947. Suspension attributed to disruption caused by coal mine holiday. Recent automotive closings have resulted in loss of more than 60,000 units

DETROIT

JUST when it appeared automobile production was catching its second wind after a short midyear breather and climbing back over the 100,000 mark, the news broke that General Motors was again plagued by depleted steel inventories, making it necessary to close all fabricating and assembly plants of the Fisher Body Division in Michigan this week, as well as assembly lines of all car divisions. Manufacturing and assembly plants in other states will be closed after materials on hand and enroute are consumed.

Household appliance, engine plants and truck operations will not be affected. The crisis was officially described as resulting from "disturbed condition in the steel industry caused by the coal mining situation during the first two weeks in July," which reduced sheet and strip steel shipments to such a low level as to make suspension of operations for inventory accumulation vital. Estimates indicate approximately 180,000 employees will lose a week's work.

Meanwhile, Chrysler Corp. Detroit assembly plants, idle for one and two weeks, were all back in the swing last week, although brief shutdowns have been scheduled this month for Indiana and West Coast assembly points. Nash resumed after a two-week vacation and inventory. Ford's Mercury assembly line, stopped because of body shortages resulting from the foremen's strike, started rolling last week with 550 returning to work.

Except for steel, and possibly pig iron and coke, materials supplies are improving generally throughout the industry. However, if further interruptions such as those experienced this month are in store, the automobile industry will fall short of the 5,000,000 unit production for this year which was being predicted widely. Previously mentioned shutdowns and the suspension by General Motors this week will mean a loss of over 60,000 cars and trucks.

Costs Still Rising

Concern is now turning again to the question of costs and prices. Wage increases to the auto industry's hourly rated and salaried employees, coupled with those accorded by most of the basic industries are spelling out another lift in the cost line. Probability of a markup in steel prices and a further boost in freight rates are two further disquieting factors, the proportions of which cannot as yet be accurately determined in terms of how much they will force up manufacturing costs. It is easy to say a $5 per ton rise in steel would amount to $10 per automobile, since the average car requires about two tons of steel gross, but that does not tell the whole story.

Automotive industry wage adjustments have added $150 million alone to the annual payroll for production workers, excluding the costs of retirement plans, increased vacation and call-in pay or salary raises to 175,000. Latest figures on employment, for April, reveal the industry total is creeping up to nearly a million—983,000, according to the Bureua of Labor Statistics.

It is still too early to forecast increases in automobile prices. There have been some adjustments, mostly upward, in truck prices, and Kaiser-Frazer raised the price of its Kaiser model $100 to dealers without increasing the retail price. Packard's price of $2975 on a new convertible model reflects the sharply higher costs under which it is operating. Generally speaking, however, the industry is believed to have adopted a hopeful policy of waiting to see just how tight the pinch is going to be. If volume can be sustained and perhaps improved a little, it is possible the present price line can be held.

On the other hand, some executives firmly believe the automobile today gives too much value for the money. To prove their point they have only to point to the long dollar which 1946 and 1947 model used cars are bringing on lots throughout the country. This reasoning may be logical for the short term, when public impatience for new cars will entice premium payments. There is question whether it would apply for the long pull when supply will more nearly balance demand and the public will be paying its dollars for value received. It is on the latter basis, taking due recognition of costs, that car prices should be determined.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,793	140,738
April	449,388	248,108
May	390,629	247,620
June	418,919*	216,637
July		331,000
August		359,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

* Preliminary.

Estimates for week ended:

June 28	103,203	66,913
July 5	63,460	45,155
July 12	91,670	74,015
July 19	104,000	80,895

GM Body Program Started

First dies and tools for the 1949 Chevrolet - Olds - Pontiac interchangeable series of bodies have been started through processing by Fisher Body, and inasmuch as the cars themselves likely will not be in production much before a year from now, there should be ample lead time for completion of the program which will mark the first comprehensive restyling of these lines since before the war. Originally, it will be recalled a die program for this line of bodies was well advanced for 1948 models. It was peremptorily suspended and the dies scrapped, with the result changes in the 1948 series will be confined to another "facelifting" treatment, probably at year-end. Thus the really new stuff in the Chevrolet and smaller Olds and Pontiac will be deferred until a year from this fall, according to present indications.

Those who have had a peep at the designs in store are not saying much but they will smile knowingly when it is suggested the present Studebaker and Kaiser-Frazer body lines, particularly the former, may be the tipoff on what is in store. Lower bodies, wider seats, improved vision with curved windows front and rear, shorter motor compartments—these constitute the major trends, to which may be added an effort to avoid the near-identical front and rear end appearance which has been the cause of so much friendly joshing directed at the present Studebaker.

Buy Centerless Grinders

A fairly heavy volume of centerless grinding machines has been placed with

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VALVE ASSEMBLY: Families of employees see how valves are assembled and tested at an open house at the Parker Appliance Co., Cleveland. Other working exhibits viewed by 2500 guests include plastics injection, rubber molding, acetylene welding, die duplicating, forging, tube bending, induction heating, automatic machining, mechanical tabulating and laboratory operations

two suppliers in recent weeks, one order involving about $125,000 worth for Ford, the other about $100,000 worth for Buick. The latter is for installation in the Buick transmission plant at Flint, presumably in connection with plans to build an automatic transmission there in the near future. This will not be the General Motors Hydra-Matic transmission, but apparently one of Buick's own design.

The Ford installation has not been definitely identified, although the machines may be for processing a redesigned valve stem guide going into the V-8 engine. Heretofore, this guide has been of the split type, precision bored and the outside surface centered and finished from the hole. Now a shift has been made to a solid tubular guide, first centerless ground on the outside and the hole bored and counterbored subsequently.

Increases Common Shares

On the financial front, Chrysler Corp. has increased its authorized common shares from 6,000,000 with $5 par value to 15,000,000 with $2.50 par value, and each of the shares now issued has been split two for one. The old stock closed at around $115 per share, and the new issue lost no time in reacting favorably, on the second day moving up to around $61, or the equivalent of an almost overnight advance of $7 per share on the old stock. The $4.94 per share quarterly earnings of Chrysler in the January-March period looked pretty good to investors.

Willys Profits Gain

Willys-Overland Motors showed consolidated net profit after taxes of $1,165,103 for the third quarter of its fiscal year ending June 30. On net sales of $37.3 million, this is the largest quarterly return for any peacetime year since 1928, and brought the nine-month profit to $2,329,990, on sales of 86,745 units or about $27 per vehicle.

UAW-FEW Merger Rejected

United Automobile Workers-CIO last week rejected a proposed merger with the Farm Equipment Workers-CIO by a 2-to-1 vote. Defeat of the merger was recognized as a victory for Walter Reuther, UAW president, who has opposed communist elements in the CIO.

The proposed merger is reported to have been supported by the leftist elements who sought to gain control of the UAW with its 900,000 members through the addition of the 45,000 farm equipment workers, who have shown a tendency to follow left wing leaders.

Had the merger been effected, the farm equipment workers would have cast about 400 votes at the next UAW convention. This would have been sufficient to defeat Reuther, who was elected last year by a margin of 124 votes.

West Coast Plant Occupied

First section of the 383,000 sq ft Lincoln-Mercury assembly plant at Los Angeles has been occupied and first assemblies will be under way early next year. The plant is located in Maywood, a suburb 10 miles from the heart of Los Angeles and 18 miles from the Ford assembly branch at Long Beach. Building is long and low, finished in slate purple, with a so-called floating foundation or base supporting the plant in individual units joined by contractable plastic as a protection against earthquakes. Daily capacity is expected to be 125 Mercury and 75 Lincoln models, both progressing down a single 700-ft final assembly line.

Paper Mill Expanded

Ford is building an addition to the Rouge plant paper mill in Dearborn, to be used for manufacture of auto panel board by a continuous process. The board is a fiber material made from waste products and used as upholstery backers, trunk liners and glove compartments. Over 70 pounds is used in every car or truck. The unit will be operating by December.

K-F Signs with FAA

Although the Foremen's Association of America appeared on its last legs after collapse of the Ford strike and enactment of the Taft-Hartley labor legislation, Kaiser-Frazer has signed a two-year agreement with the FAA local at the Willow Run plant, calling for wage increase of $32.50 per month or 9 per cent, whichever is greater, retroactive to April 28 and covering 400 foremen at Willow Run and 108 at the Detroit engine division.

Formula for Success

James D. Mooney, Willys-Overland president, told the Toledo Small Business Men's Association recently he intends some day to write a book on scientific business management, which "will have 344 pages. On the first page the first sentence will be, 'To be successful in business a man should get up at the crack of dawn and work 16 hours a day seven days a week.' The last sentence will be, 'Don't make the same mistake twice.' The other 342 pages will be blank."

New Jeep Truck Unveiled

A four-wheel drive jeep truck has been unveiled by Willys-Overland, suitable for both off and on the road use and supplementing other truck and commercial models introduced a few weeks ago.

Yoloy saves money eight ways

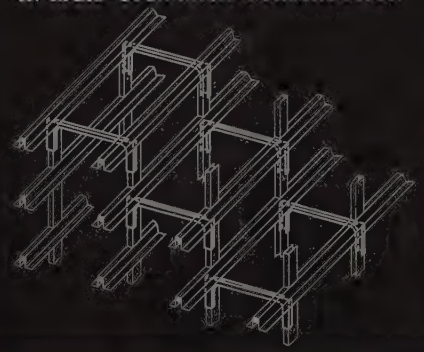
THESE ARE THE SAVINGS

says truck-body builder
(reproduced verbatim from catalog)

1. 500 lbs. to 1000 lbs. saved in mounted weight.
2. At least 5% saving in gas and oil expense.
3. Reduced tire wear and chassis maintenance.
4. Maximum payload with any gross load rating.
5. Case life doubled.
6. Loss from pilferage reduced to a minimum.
7. Loading and unloading time reduced to a minimum.
8. Increased deliveries per driver salesman.

As shown above and in the sketch at right, all bodies with Slider Rail (patented) Construction are assembled from high-tensile steel formed sections, electrically welded into a rigid unit which is hundreds of pounds lighter than any other type of construction.

HOW YOLOY STEEL SECTIONS ARE WELDED IN RIGID OPEN-RACK CONSTRUCTION



By the proper use of Yoloy steel in this truck body eight major cost reducing advantages are obtained. Users of trucks made of Yoloy steel have found by actual experience that all of the money making features are actually accomplished.

Yoloy, Youngstown's nickel-copper High Strength Low Alloy steel, is ready to help you too in manufacturing equipment of longer life and better performance. It is recommended where greater strength is needed, where dead weight should be reduced to permit greater pay load or where severe corrosive conditions exist.

Yoloy's greater toughness and strength, its unusual ability to resist corrosion and fatigue, and its excellent welding and forming characteristics lend themselves readily to structural fabrication. Over ten years of successful service have proven the advantages of Yoloy in hundreds of difficult applications. Yoloy steels are produced in plates, sheets, strip, shapes, bars, cold drawn bars, seamless and electric welded pipe. Let us consult with you about your requirements.

QUALITY YOUNGSTOWN SERVICE

YOUNGSTOWN

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Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

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Wheeling Steel Plant Expansion Program Started

Management takes initial steps in $32,125,000 facilities improvement plan. Largest contract let so far is for coke ovens

LARGE expansion and improvement program is under way at Wheeling Steel Corp.'s plants, eventually expected to involve expenditures of $32,125,000. Most of the improvements will be at the corporation's Steubenville Works, with some at Benwood, W. Va., and Harmarville, Pa.

Purchase by Wheeling recently of the South Works of its Steubenville, O., plant and the sale of its Portsmouth, O., plant represented initial steps in a plan designed to reduce operating costs by eliminating high-cost facilities and through concentrating production of pig iron, steel ingots and semifinished products at Steubenville.

As a part of the plan the corporation proposes to integrate physically the three sections of the Steubenville plant, namely the South Works, Steubenville North and East Steubenville, into one operating unit with expanded production and increased general efficiency.

Program also includes changes in pipe production facilities at the Benwood plant, and improvements to Consumer Mining Co.'s Harmarville mine.

Koppers Gets Contract

Largest contract under the program awarded to date involves $12,525,000 with the Koppers Co. Inc., Pittsburgh, for coke ovens, byproduct recovery plant, coal handling and preparation equipment and coke screening and loading station.

Blast furnace improvements at the corporation's South Works include reconditioning of two stacks, installation of door thickeners and stock bins, at an estimated cost of $3,387,000.

Improvement to the bessemer plant at South Works includes reconditioning of two bessemer converters and installation of ingot mold cars and related equipment at a cost of approximately $921,000. Estimated cost of establishing the blooming mill department at the South Works and moving, re-erecting and electrifying the 35-in. blooming mill from Benwood plant will amount to $1,710,000. Total cost of installing two new batteries of coke ovens at East Steubenville will eventually amount to $14,549,000. Installation of additional soaking pit, with cranes and assorted equipment at Steubenville North and South Works, will approximate $1,529,000. Construction of and improvements to power and boiler houses at the Steubenville Works are estimated at $849,000. Improvements of the South Works plant site and purchase price of the South Works will involve an estimated $6,505,000.

The corporation plans installation of a new continuous butt-weld tube mill at the Benwood plant, to cost about $1,887,000; and a new boiler house for $420,000. Installation of additional locomotives and mine ventilating and electrical equipment at the Harmarville mine will cost approximately $368,000.

Upon completion of the construction and improvement program, it is expected monthly capacities of the respective facilities in the Steubenville plant will have been increased by approximately 50,000 net tons of coke, 48,750 tons of pig iron and 25,800 net tons of bessemer steel ingots; additional hot metal available will increase the monthly steel ingot capacity at Steubenville North Works by about 6600 net tons.

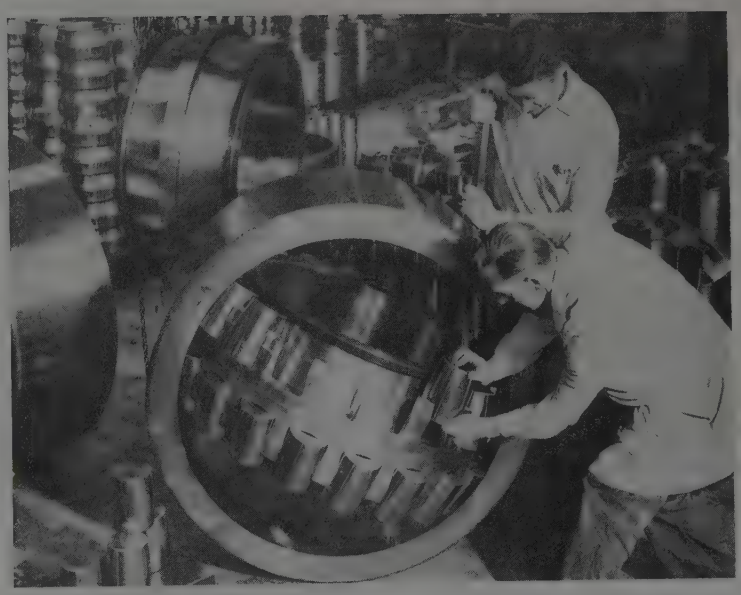
Pig iron and steel ingot producing facilities will be concentrated at Steubenville plant (which will have an estimated annual capacity of 1,300,000 net tons of coke, 1,197,000 tons of pig iron, 1,462,000 tons of open hearth and bessemer steel ingots) with the finishing and fabricating operations carried on at that plant and various other plants located relatively close to Steubenville.

The additional 25,800 net tons a month of bessemer steel ingot production to be added to the Steubenville plant will, in effect, substantially replace the present ingot production at Benwood.

The corporation estimates that, if necessary, additional ingot tonnage can be obtained by an increase in present capacity of existing open-hearth furnaces at the Steubenville plant through improvements estimated to cost $5 million. This sum is not included in the present estimated cost of the program of $32,125,000.

The new blooming mill now used at the Benwood plant is to be transferred to the South Works primarily because bessemer ingot production is proposed to be discontinued at Benwood and commenced at the South Works plant. When installed at the South Works, the blooming mill will have a capacity to roll small billets, required for butt-weld pipe, about 20 per cent in excess of present capacity and, if utilized to produce slabs, a capacity of about 100 per cent in excess of present capacity.

With installation of the new continuous butt-weld tube mill at Benwood plant, butt-weld tube facilities at that plant will have been completely modernized and it is expected that the Benwood plant will then have an estimated monthly capacity of 20,000 net tons of butt-weld pipe, reaching an increase of 33 1/3 per cent of its present capacity. It is proposed production of lap-weld pipe at Benwood would then be stopped.



SKF EXPANDS: With demand for antifriction bearings up two to five times the prewar levels, SKF Industries Inc. is spending $4 million to expand and modernize its two Philadelphia plants. Primary aim of the program is to increase the output of spherical roller bearings. Above, workers are shown assembling huge bearings to be used in a new Wisconsin paper mill. Acme photo

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Kutztown Foundry & Machine Corp., New York, manufacturer of gray iron and special castings, has broadened its employees' group insurance program so that protection is provided for disability, hospitalization and surgical operation in addition to the life coverage to which the program was formerly limited.

—o—

W. W. Faris Mfg. Co., manufacturer of hospital and laboratory equipment and other metal products, has moved to its new plant and office at 2101 S. Hanley Rd., St. Louis.

—o—

Weiss Steel Co. Inc., Chicago, has succeeded Midland Steel & Equipment Co. in the steel warehousing business.

—o—

Meehanite Metal Corp., New Rochelle, N. Y., announces that it has contracted with the following three companies for the manufacture of meehanite castings: Standard Foundry Co., Worcester, Mass.; Shenango-Penn Mold Co., Dover, O.; K. L. Tractors Pty. Ltd., British Tasmania.

—o—

Aldrich Pump Co., Allentown, Pa., pump manufacturer, has announced that Petroleum Machinery Co., New York, will be its representative in the New York area. The New York firm has been and will continue to be Aldrich's foreign representative.

—o—

General Electric Co., Schenectady, N. Y., has appointed Lorain County Radio Corp., Lorain, O., as distributor of its electronic equipment for ships of 1000-ton capacity and over on the Great Lakes.

—o—

Hansen Mfg. Co., Cleveland, manufacturer of air line equipment and hose couplings, has purchased a plant from Berger Machinery & Mfg. Co. at 4031 W. 150th St. for $112,000. The property includes a one-story factory, with offices and a warehouse, and has a total floor area of 19,600 sq ft.

—o—

Standard Tube Sales Corp., eastern sales representative for seamless and welded steel tubing manufacturers, is celebrating its tenth anniversary by moving to 76-01 Woodhaven Blvd., Brooklyn, N. Y., on Aug. 1.

—o—

Bingham Stamping Co., Toledo, O., which recently merged with Herbrand Corp., Fremont, O., reports combined net earnings for the two companies, less inter-company dividends for the eight months ended May 31, 1947, of $642,564. This was equivalent to $2.60 a share on the 246,872 shares of common stock presently outstanding.

—o—

Pemco Corp., Baltimore, has recently completed its sixth wholly continuous smelter unit. This addition, which was built for the smelting of porcelain enamel frit and ceramic glazes, is expected to increase Pemco's productive capacity on these items more than 50 per cent.

—o—

Norge Division, Detroit, Borg-Warner Corp., has announced two new household appliances, a two-broiler gas range and a divided-top electric range.

—o—

Emerson Radio & Phonograph Corp., New York, has introduced five new radio models ranging from a personal portable priced at $19.95 to a small television set to sell for $375. The company reports that its radio sales during the past 12 months tripled those of any prewar year.

—o—

Kaiser-Frazer Corp., Willow Run, Mich., produced 705 automobiles on July 10, the largest number of cars made in one day by the company. The previous high was achieved on June 22, 1947, with a production of 686 cars.

—o—

Flint Steel Corp., Tulsa, Okla., (formerly Tulsa Boiler Machine Co.) is warehousing Aristoloy alloy steel bars. Aristoloy is the trade name of electric furnace steels produced by Copperweld Steel Co., Warren, O.

—o—

James F. Lincoln Arc Welding Foundation, Cleveland, announces that winners of 452 awards totaling $200,000 in its Design-for-Progress Award program will be determined by a jury of 22 educators now in session at Dartmouth College, Hanover, N. H. Author of the winning paper will receive $13,200.

—o—

B. F. Goodrich Co., Akron, announces that it now has over 5200 active employees with 20 or more years of service with the company.

—o—

War Assets Administration has announced approval of sale and lease of certain portions of the Portsmouth Naval Shipyard, at Comerworth, N. H., to General Electric Co., Schenectady, N. Y.

—o—

Reed-Prentice Corp., Worcester, Mass., manufacturer of machine tools, die casting machines and plastic injection molding machines, has appointed Calco Machinery Co., Philadelphia, as its agent for eastern Pennsylvania, southern New Jersey, Maryland, Delaware, part of Virginia and the District of Columbia.

—o—

Precision Castings Co. Inc., Fayetteville, N. Y., tool and die manufacturer, has purchased from WAA for $278,000 a magnesium and die casting plant in Fayetteville which it operated for the government during the war.

—o—

Kelite Products Inc., Los Angeles, manufacturing industrial chemicals for cleaning and processing, has organized Kelite Products Co., Flushing, N. Y., to handle its sales and service on the Atlantic coast. Gene Goble will be in charge.

—o—

Westinghouse Electric Corp., Pittsburgh, has filmed a new 16 mm sound motion picture to explain principles and applications of radio frequency heating in industry.

—o—

W. & L. E. Gurley, Troy, N. Y., manufacturer of engineering instruments, has enlarged its reticle-making department in order to produce glass reticles for all types of optical measuring instruments. Until recently, Gurley made reticles solely for its own requirements.

—o—

E. G. Hardig, manufacturers' representative, has moved to 7644 Woodward Ave., Detroit.

—o—

Ford Motor Co., Dearborn, Mich., announces that 11 more California manufacturers have received a total of 24 new contracts for automotive parts in the company's $50 million West Coast procurement program.

—o—

General Alloys Co., Boston, manufacturer of castings, has purchased from WAA for $38,000 a castings facility in Boston which it leased during the war. Land, buildings, machinery and equipment included in the transaction are so closely integrated with lessee-owned property that attempts at severance would have caused plant operation damage, WAA officials said.

—o—

Thompson Products Inc., Cleveland, manufacturer of bolts, valves and other automotive and aircraft products, has released a booklet containing statistical information concerning the company's employees. Information given includes average income, amount of insurance carried, number of children per family, number who own their own homes and average savings.

—o—

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., manufacturer of gray iron and steel castings, has acquired from WAA for $696,667 facilities which were integrated into the the firm's Muskegon plant to increase war production.

The Business Trend

Upward Production Surge Follows Work Stoppages

INDUSTRIAL activity again is pushing its way toward the level it closely maintained throughout most of the first half of the year. Quick settlement of the coal issue before pipelines and stockpiles were emptied allowed production to swing upward, STEEL's industrial production index jumping to 148, a gain of 24 points from the previous week's 124, the lowest level recorded since mid-June, 1946.

Although higher manufacturing costs and in turn higher sales prices for many consumer durable goods are anticipated as a result of the miners' wage boost, indications continue to point to strong consumer demand, with average weekly wages in manufacturing industries breaking all records and employment mounting to over 60 million.

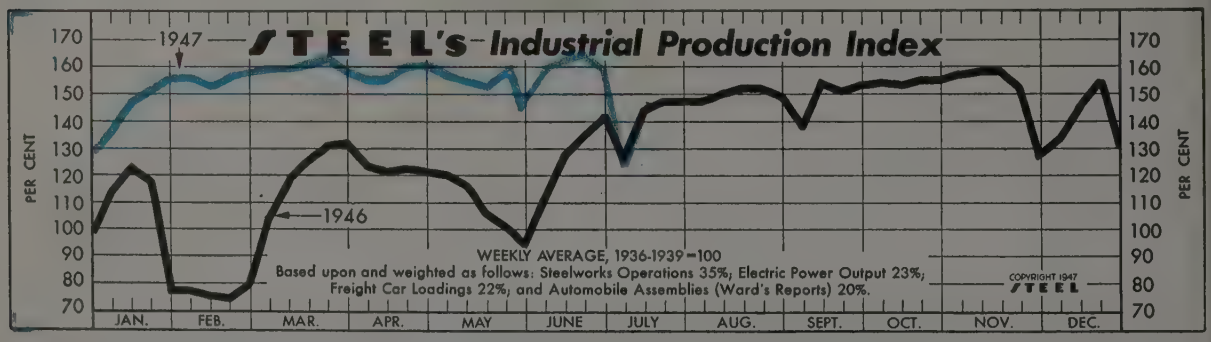
STEEL—Rapid recovery from effects of vacation closings, the holiday weekend and coal mine shutdowns resulted in a 13-point gain in steel ingot production, the national rate rising to 86 from the year's low level of 73 Peacetime record production of 42,267,320 net tons of steel ingots and steel for castings in the first half of the year coupled with prospects for a continuing high level of operations for the remainder of the year is expected to bring about a supply-demand balance in many steel products by year-end.

AUTOS—Contributing importantly to the rise in industrial production over the preceding week is automobile and truck output which is estimated at 91,670 units, an increase of nearly 2500 units daily over the Fourth of July week. A large part of the increase is attributed to reentry into production of the Chrysler passenger car assembly plants in the Detroit area.

COAL — Production of bituminous coal from Jan. 1 through July 5 was approximately 312,917,000 tons, an increase of 70,940,000 tons or 29.3 per cent over that mined during the comparable period of 1946, National Coal Association reports. Production during the week ended July 5, however, was at the lowest point of the year, totaling about 1,940,000 net tons.

PRICES—Higher prices for both agricultural and industrial commodities combined to boost the Bureau of Labor Statistics' index for the week ended July 5 to the highest level since early April and to a point 0.3 per cent above the previous week. The index is now 26.3 per cent above that of the corresponding week of 1946. Although the bureau's index does not yet reflect the higher coal prices resulting from the miners' wage settlement, raw material prices increased 1.0 per cent over the previous week.

WAGES—Average weekly earnings in the manufacturing industries rose $1.36 in May to the alltime high of $48.86, according to preliminary figures by the Bureau of Labor Statistics. In the durable goods industries, despite a drop of about 6 hours in the work-week since the wartime peak, average weekly wages are within a dollar of their record high, being estimated at $52.63.



The Index (see chart above): Latest Week (preliminary) 148 Previous Week 124 Month Ago 162 Year Ago 144

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	86.0	73.0	96.5	86.0
Electric Power Distributed (million kilowatt hours)	4,531	4,190	4,702	4,156
Bituminous Coal Production (daily av.—1000 tons)	323	1,333	2,250	1,111
Petroleum Production (daily av.—1000 bbl.)	5,045	5,065	5,113	4,934
Construction Volume (ENR—Unit $1,000,000)	$76.7	$105.6	$158.1	$150.6
Automobile and Truck Output (Ward's—number units)	91,670	63,460	97,943	74,015

*Dates on request. †1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

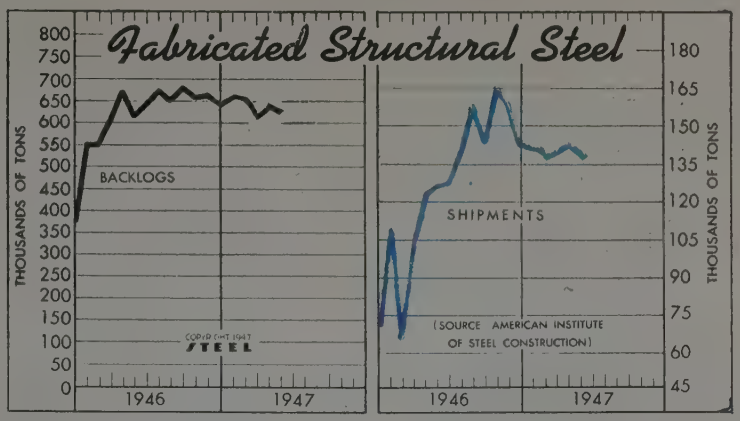
TRADE				
Freight Carloadings (unit—1000 cars)	775‡	629	895	895
Business Failures (Dun & Bradstreet, number)	60†	82	66	13
Money in Circulation (in millions of dollars)‡	$28,363	$28,409	$28,253	$28,335
Department Store Sales (change from like wk. a yr. ago)‡	+8%	+3%	+7%	+26%

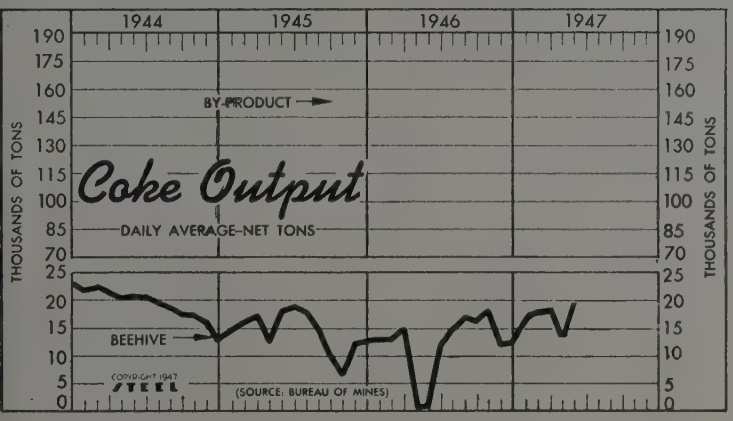
‡Preliminary. †Federal Reserve Board.

Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1947	1946	1945	1947	1946	1945
Jan.	140.6	107.5	57.0	661	552	124
Feb.	136.1	63.8	49.0	656	551	152
Mar.	137.8	102.8	59.5	614	605	153
Apr.	140.8	122.5	62.8	632	674	163
May	136.4	124.4	72.6	628	615	166
June	....	126.8	69.2	...	642	195
July	....	140.2	69.9	...	674	194
Aug.	....	157.5	70.6	...	651	201
Sept.	....	141.9	63.4	...	682	248
Oct.	....	164.7	76.6	...	660	283
Nov.	....	157.3	78.0	...	665	305
Dec.	....	142.1	68.8	...	646	375
Total	....	1,551.6	797.4			





Coke Output

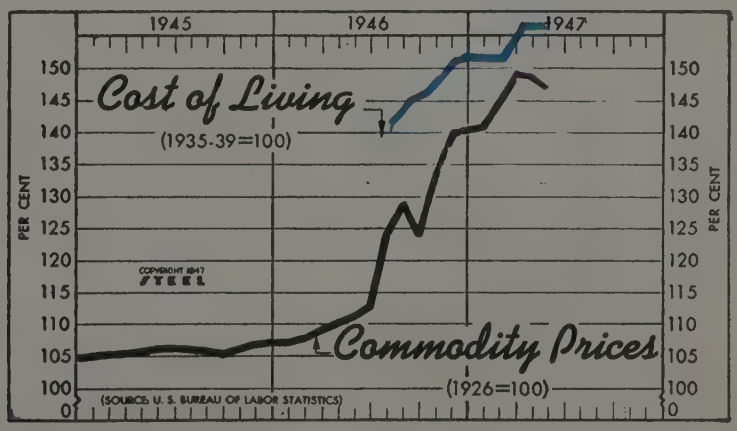
Bureau of Mines

(Daily Average—Net Tons)

	By-Product		Beehive	
	1947	1946	1947	1946
Jan.	181,245	122,570	18,124	13,093
Feb.	183 189	93,985	18,372	13.140
Mar.	182.529	161,290	18,725	14.962
Apr.	179,428	128,394	14,315	713
May	178,413	83,019	19,136	869
June	....	147,272	....	12 218
July	....	171,703	....	15.105
Aug.	....	176,195	....	16.892
Sept.	....	178,156	....	16.1?7
Oct.	....	177,817	....	17 954
Nov.	....	164,165	....	12.028
Dec.	....	153,826	....	12,302
Ave.	....	146,877	....	11 991

Wholesale Commodity Price—Cost of Living Indexes

	Commodities (1926=100)			Living Cost (1935-39=100)		
	1947	1946	1945	1947	1946	1945
Jan.	141.5	107.1	104.9	153.3	129.9	127.1
Feb.	144.5	107.7	105.2	153.2	129.6	126.9
Mar.	149.5	108.9	105.3	156.3	130.2	126.8
Apr.	147.7	110.2	105.7	156.1	131.1	127.1
May	146.9	111.0	106.0	155.8	131.7	128.1
June	....	112.9	106.1	....	133.3	129.0
July	....	124.7	105.9	....	141.2	129.4
Aug.	....	129.1	105.7	....	144.1	129.3
Sept.	....	124.0	105.2	....	145.9	128.9
Oct.	....	134.1	105.9	....	148.6	128.9
Nov.	....	139.7	106.8	....	152.2	129.3
Dec.	....	140.9	107.1	....	153.3	129.9
Ave.	....	120.9	105.8	....	139.3	128.4



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,904	$13,872	$12,773	$10,738
Federal Gross Debt (billions)	$258.2	$258.4	$257.4	$268.2
Bond Volume, NYSE (millions)	$18.2	$17.2	$15.6	$17.8
Stocks Sales, NYSE (thousands)	6,098	4,191	4,560	4,501
Loans and Investments (billions)†	$63.4	$55.0	$54.6	$61.0
United States Gov't. Obligations Held (millions)†	$38,990	$34,312	$33,843	$42,744

†Member banks, Federal Reserve System.

PRICES

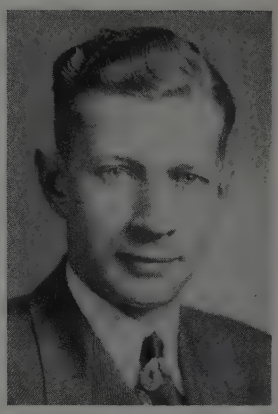
STEEL's composite finished steel price average	$69.82	$69.82	$69.82	$64.45
All Commodities†	148.0	147.6	147.9	117.2
Industrial Raw Materials†	162.6	161.6	161.8	135.2
Manufactured Products†	142.8	142.7	142.9	110.9

†Bureau of Labor Statistics Index, 1926 = 100.

Men of Industry

C. R. HELLER

C. H. MURRAY



D. F. WENZEL

C. R. Heller has been appointed to represent the A. B. Farquhar Co., York, Pa., in the company's new sales office, 1009 Washington Gas Light Bldg., Washington. He will handle the sale of materials handling conveyors, farm machinery and hydraulic presses, and will confine his efforts to governmental and armed service bureaus located in Washington and foreign purchasing commissions. Mr. Heller, during the war, had been with the War Production Board as chief of the Material Handling Equipment Branch of the General Industrial Equipment Division.

—o—

Edward L. Stockdale has been elected president of Universal-Cyclops Steel Corp., Bridgeville, Pa. He succeeds **Walter H. Baker,** who founded this firm in 1908 and was its principal executive officer until his sudden death June 26. Mr. Stockdale has held various executive positions with Universal-Cyclops for 33 years, and has been executive vice president for the past 10 years.

—o—

S. R. Ives has been elected president of Armco Drainage & Metal Products Inc., Middletown, O., subsidiary of the American Rolling Mill Co. **M. C. Patton** has been elected executive vice president and **H. D. Neill,** vice president in charge of sales. Mr. Ives and Mr. Patton have also been elected president, and executive vice president, respectively, of Armco Drainage & Metal Products of Canada Ltd.

—o—

Arthur S. Klopf, works manager of all plants of the Western Foundry Co., Chicago, has been elected to the additional post of vice president. Mr. Klopf became associated with the company about a year ago.

—o—

J. D. Quinn, formerly assistant general manager of Franklin Steel Works, Franklin, Pa., has joined the Jersey Shore Steel Co., Jersey Shore, Pa.

—o—

C. H. Murray, vice president, American Rolling Mill Co., Middletown, O., has been appointed by the United States Department of Labor as a principal delegate representing the iron and steel industry at the International Labor Conference in Stockholm, Sweden, from Aug. 19 to Sept. 21, 1947.

—o—

Earl S. Mollard has been appointed manager of mines, Butler Bros., St. Paul, Minn. **C. L. Wyman** has been appointed vice president of sales, and **Peter Warhol,** vice president of operations for the company.

—o—

Berton H. DeLong has been appointed vice president and technical director of the Carpenter Steel Co., Reading, Pa. **George B. Luerssen** has been named chief metallurgist. Mr. DeLong has been connected with the company since 1910 and, before his promotion, had been vice president and chief metallurgist.

—o—

Frank F. Chiles, formerly sales manager of the Andrews Steel Co., Newport, Ky., has been placed in charge of the Cincinnati office of S. A. Richardson & Associates, Cleveland.

—o—

Charles R. Mougey has been named sales promotion and advertising manager of Wilson Cabinet Co. Inc., Smyrna, Del. He formerly had been connected with the Air-Temp Division of Chrysler Corp.

—o—

Stanley Bracken, executive vice president, Western Electric Co., New York, has been elected president to succeed **Clarence G. Stoll** on his retirement Sept. 30. Mr. Stoll has served as president of the company since 1940, and his retirement brings to a close a career of more than 44 years with Western Electric. Mr. Bracken has been associated with the company for 35 years. He had been president of Teletype Corp., a Western Electric subsidiary, which post he resigned in 1941 to become general manager of manufacturing of Western Electric, and a director of the company. He became vice president in 1942 and executive vice president in 1947.

—o—

D. F. Wenzel has been appointed manager of sales of the Wisconsin office of Globe Steel Tubes Co., Milwaukee. He will maintain headquarters in Milwaukee. Mr. Wenzel has been associated with Globe Steel Tubes Co. for the past 11 years in the general sales office. He succeeds **T. R. Coffey,** recently transferred to the Detroit office.

—o—

Samuel F. Rolph has been named general manager of Norton Door Closer Division, Yale & Towne Mfg. Co., New York.

—o—

Edward W. Hill has been appointed general manager, Industrial Division, Loftus Engineering Corp., Pittsburgh. He will be in charge of design and construction of bessemer and open-hearth furnaces, soaking pits and rolling mills. Mr. Hill formerly held supervisory positions with the Carnegie-Illinois Steel Corp., Pittsburgh, and resigned in 1943 to become a vice president of La Consolidada, S. A., Mexico City. Since 1945 he has been associated with Corporation de Fomento de la Produccion, New York, in the planning of an integrated steel mill for Chile.

—o—

John F. Cunningham Jr. has been appointed manager of the J. P. Devine Mfg. Co.'s plant at Mt. Vernon, Ill. He formerly had been research engineer and

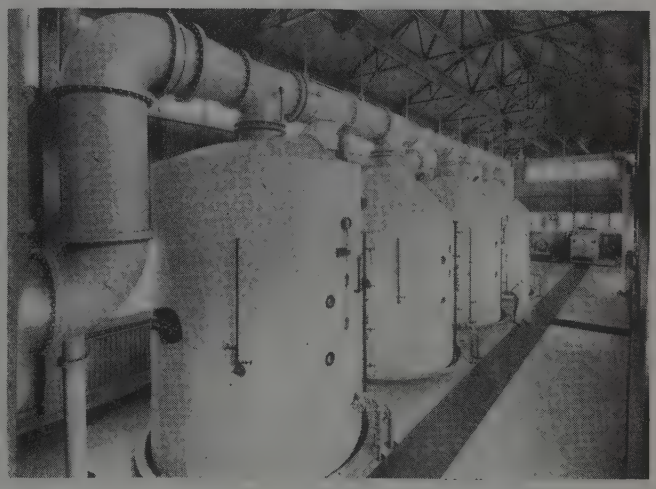
HARPER fastening NEWS

MONEL AND STAINLESS FASTENINGS RESIST CHEMICALS IN EVAPORATOR SERVICE

Paper Pulp, Salt, Distilling Industries Save Maintenance Cost

Pulp washer and black liquor evaporator using Harper monel bolts.

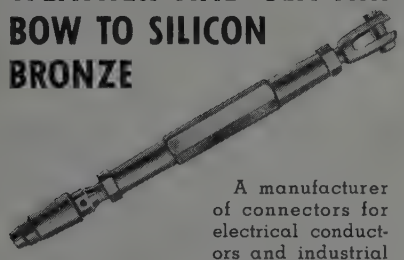
Chemicals ranging from sulphur and alkaline solutions in paper pulp manufacture to acids found in the production of rayon are handled in suitable equipments made by a large evaporator concern. This manufacturer has found that Monel and Stainless steel bolts, rivets and other fastenings, even in evaporators constructed basically of lead, reduce corrosion and provide easy disassembly and reassembly in maintenance and service.



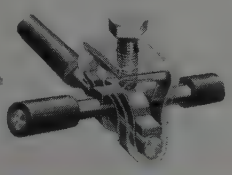
Basket type evaporators in processing of salt use Harper monel and stainless steel fastenings.

Wherever there is handling of salt, ammonium sulphate, sulphur, alkalies, acids, distillers by-products and many others Harper non-ferrous or stainless steel fastenings can save cost and eliminate breakdown due to corrosion.

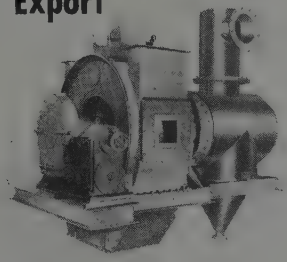
WEATHER AND SEA AIR BOW TO SILICON BRONZE



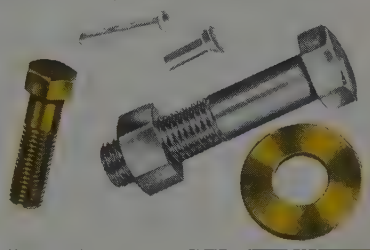
A manufacturer of connectors for electrical conductors and industrial and marine wire rope service specifies silicon bronze for resistance to "season cracking" and atmospheric corrosion. Harper Silicon Bronze nuts and bolts are used on many of these turnbuckles, tap connectors and others to promote long life and low cost maintenance.



Monel Fastenings Reduce Maintenance in Equipment for Export



Equipment manufactured for export and for use remote from servicing facilities requires extra care for prevention of breakdown and excessive maintenance. In a Top feed Vacuum type dryer recently shipped to Australia for use in the sulphate plant of a steel mill Harper Monel Metal fastenings were used to resist the chemical corrosion and promote trouble-free operation.



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HARPER Chicago

HARPER SPECIALIZES IN EVERLASTING FASTENINGS

Manufacturing Division engineer for the Elliott Co., Jeannette, Pa., during the development of the first gas turbine power plant built in America.

—o—

Frank U. Hayes has been appointed sales manager of Bullard Co., Bridgeport, Conn. He joined the company in 1935 and was made assistant sales manager in 1942.

—o—

George W. Burpee, president of General Aniline & Film Corp., Binghamton, N. Y., will retire from that post late this month to resume his position as partner in the engineering firm of Coverdale & Colpitts.

—o—

Harold C. Clark has joined the Rosco Mfg. Co., Minneapolis. He will have charge of all sales for the company east of the Mississippi river. Mr. Clark previously had been associated with the Cleaver-Brooks Co., Milwaukee.

—o—

George E. Westphal, superintendent of the machine shop, Studebaker Corp., South Bend, Ind., has been named general factory superintendent to succeed **Bert Fowler**, who has retired. **E. M. Douglas**, executive engineer, has been named vice president in charge of manufacturing for Studebaker Pacific Corp., succeeding **Stanley Whitworth**, retired. **A. G. Lass** succeeds to Mr. Douglas' former post. **C. N. Rhoutsong**, assistant purchasing agent for Studebaker, has been named director of purchases, and **L. R. Runkle**, formerly superintendent of the tool department, has been appointed master mechanic. Other appointments are **E. J. Hardig** as a member of the executive engineering committee; **S. A. Jeffries**, executive truck engineer; **R. E. MacKenzie**, chief truck engineer; and **Del Cleland**, machine shop superintendent.

—o—

W. S. Rockwell Co., Fairfield, Conn., has announced the following appointments to its sales organization: **Frank Matzek**, of the General Combustion Co., Birmingham, has been appointed exclusive agent in Alabama, Mississippi and northwestern Florida for the sale of furnaces, ovens, special machinery, burners, and valves. **D. A. Gilbert**, formerly with Chase Brass & Copper Co., Cleveland, has been appointed exclusive agent for the sale of furnaces, ovens, and valves in Ohio. **Gil Moore** has been appointed exclusive agent for the sale of valves in southern California. **C. E. Hammers**, of the Peto-O-Fire Co., Los Angeles, has been appointed exclusive agent for the sale of furnaces and ovens in southern California. Fillmore & Fillmore, Buffalo, has been named exclusive agent for the sale of Rockwell's furnaces and ovens in western New York and northwestern Pennsylvania.

—o—

C. P. Walker, Westinghouse Electric Corp., Pittsburgh, has been appointed to head textile industry activities for the general mills section, industrial sales department of the corporation, at East Pittsburgh, Pa. He previously had been in the Atlanta office.

—o—

G. R. Stewart and **C. P. Ebert** have joined the National Cylinder Gas Co., Chicago, as a member of the executive staff and director of purchasing, respectively. Mr. Stewart had been with Young & Rubicam, Chicago, and Mr. Ebert, with the Chicago district purchasing department of the Carnegie-Illinois Steel Corp., Pittsburgh.

—o—

Frederic G. Syburg, director of purchases of the Chain Belt Co., Milwaukee, has been elected president of the Milwaukee Association of Purchasing Agents. Other officers elected are: **Clifford H. Dawley**, Ampco Metal Co., vice president; **H. Howell Pritchard**, Kearney & Trecker Corp., secretary; **Norman Showalter**, West Bend Aluminum Co., treasurer; and **Edward L. Block**, Unit Drop Forge Division of Fuller Mfg. Co., national director.

—o—

Carroll V. Roseberry, sales engineer in the San Francisco area for Westinghouse Electric Corp., Pittsburgh, has been named assistant West Coast district manager for the company's Central Station Division.

—o—

L. E. Osborne has been elected director of the freight traffic department of the California Manufacturers Association.

—o—

New Milwaukee members of the American Foundrymen's Association and its Wisconsin chapter include **L. M. McMahon**, sales manager for Walter Gerlinger Inc.; **Walter E. Brandt**, Pelton Steel Casting Co.; **Oscar F. Ketter** of the Oilgear Co.; and **George A. Stolze**, Allis-Chalmers Mfg. Co.

—o—

Ralph M. Heinan, assistant traffic manager, National Enameling & Stamping Co., Milwaukee, has been promoted to director of transportation, which is a post newly created by the company.

—o—

David F. Sklar, formerly with Wilson Mechanical Instrument Co. Inc., New York, and for the past 10 years chief design and development engineer, has formed the Kent Cliff Laboratories, Peekskill, N. Y. This organization is available for consultation, development and the manufacture of hardness testing equipment and associated apparatus.

—o—

Owen G. Watterman has been appointed sales manager at Zagar Tool Inc., Cleveland. He has been connected with the company for the past six years in the engineering department.

—o—

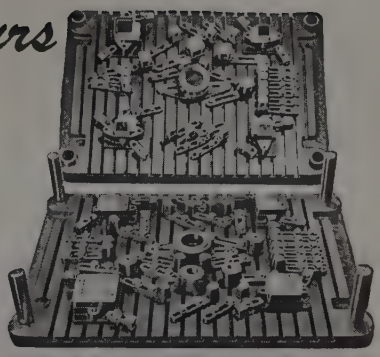
Walter D. Baldwin has been appointed director of manufacturers' sales for the Tire Division, United States Rubber Co.,

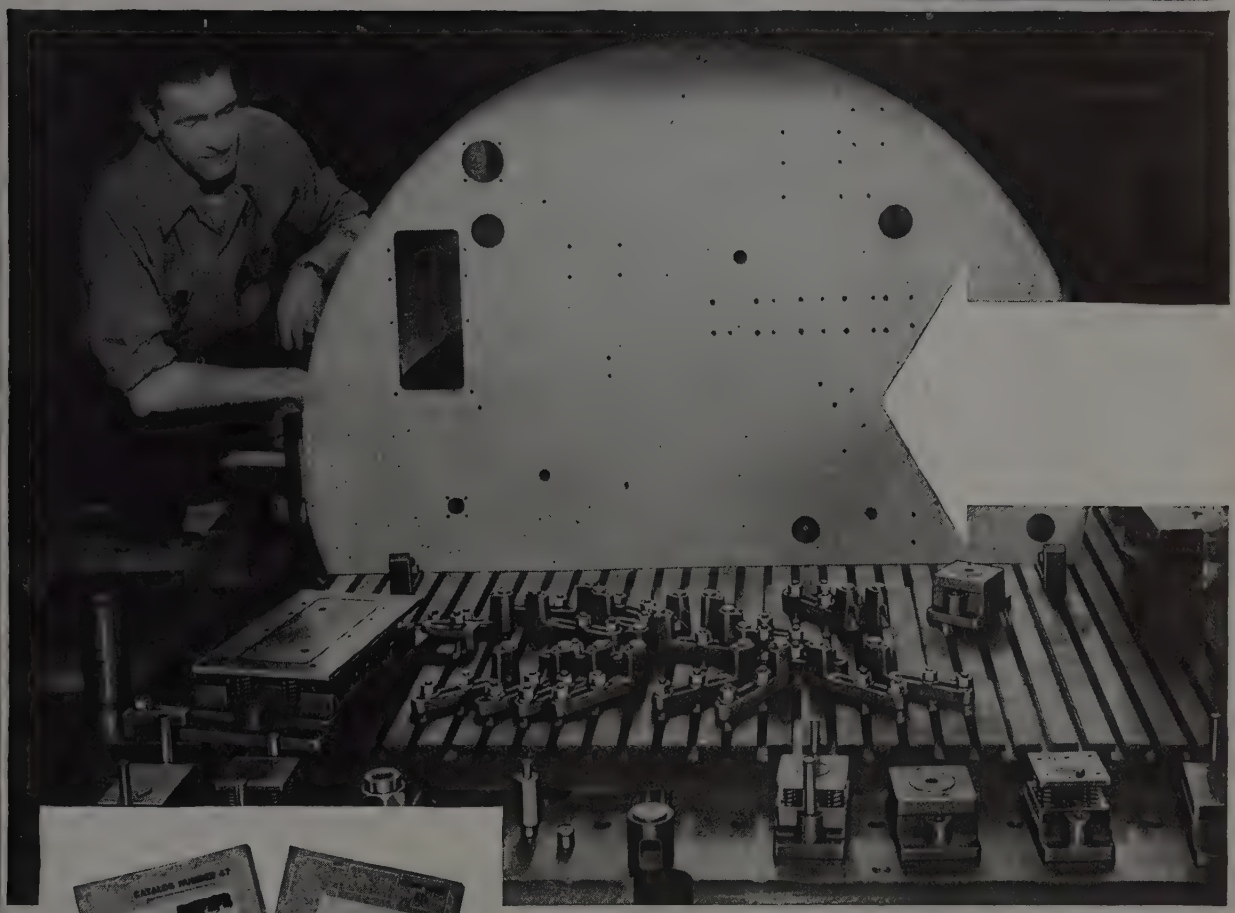
GEORGE E. WESTPHAL

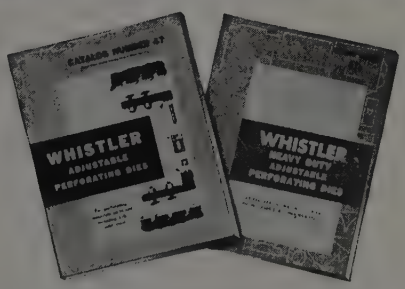
E. M. DOUGLAS

OWEN G. WATTERMAN

Get into Production in a few hours with







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New York. He has been sales manager of the company's U. S. Tires Division for the last two years, and is succeeded by **J. Chester Ray.** **Harry M. Ramsay** has been named sales manager of the Fisk Tires Division of the company.

—o—

Charles S. Thorn, vice president and general manager, Birmingham Electric Co., Birmingham, has been elected president to succeed **William M. Rogers.** Mr. Rogers has resigned as president but will continue as chairman of the board of directors of the company.

—o—

H. C. McElhone has been elected vice president in charge of sales of the Lamb Electric Co., Kent, O. He formerly had been assistant to the vice president in charge of sales, Westinghouse Electric Corp., Pittsburgh.

—o—

Leverett Lyon, chief executive officer of the Chicago Association of Commerce & Industry, and **John Sloan Dickey,** president of Dartmouth College, have been elected to the board of trustees of the Brookings Institution.

—o—

Dr. Waldo Shumway, former assistant dean of the College of Liberal Arts & Sciences of the University of Illinois, has been named dean of Stevens Institute of Technology, effective in September. He succeeds **Dean Frederic H. Camp,** who will become assistant to the president.

—o—

George E. Smith has been appointed a representative and engineer in the Middle Atlantic district for Kennametal Inc., Latrobe, Pa. He will maintain headquarters in Philadelphia.

—o—

John H. Biggs, Brown & Sharpe Mfg. Co., Providence, R. I., has been appointed a representative in Rochester, N. Y. He previously had been connected with the New York office of the company. **Earl P. Leeds,** formerly Rochester representative, has joined the general sales staff at the Providence office.

—o—

Paul Rhodes has been appointed purchasing agent for the Hyster Co., Portland, Ore. He had been in the Chicago office of the company.

—o—

James G. Harbord has resigned as chairman of the board of Radio Corp. of America, New York. **David Sarnoff,** who has been elected chairman, will also continue as president of RCA. **Harry C. Ingles,** president of RCA Institutes Inc., has been elected a director of Radio Corp. of America and its subsidiaries, National Broadcasting Co. Inc. and RCA Communications Inc.

—o—

Reginald G. Standerwick, engineer, Aircraft Gas Turbine Division, Lynn, Mass., of General Electric Co., Schenectady, N. Y., has retired after 38 years' association with the company. **B. A. Case** has been appointed a member of the design engineering staff of General Electric's apparatus department. He has been serving as assistant design engineer of the Fractional-hp Motor Engineering Division.

—o—

I. W. Thompson has been named general parts and accessories manager, and **E. L. Harrig,** national general service manager, for Chevrolet Division, General Motors Corp., Detroit. Both men have been assistant managers in their respective departments.

—o—

H. W. Anderson, president and general manager, Fidelity Machine Co., Philadelphia, for the past 22 years, has been elected vice president and a director of H. Brinton Co., Philadelphia.

—o—

Vascoloy-Ramet Corp., North Chicago, Ill., has announced the opening of two new branch offices. **Frank H. Scheffler** will head the new office located at 7041½ Harrisburg Blvd., Houston, Tex., which will embrace the southwest area. **Dean R. Cline,** recently released from military service, will head the new office at 315 Union Arcade Bldg., Davenport, Iowa, serving Tri-Cities and southern Iowa area. The company has also announced the appointment of the Tool Engineering Service, 505 North 22nd St., Birmingham, as a new manufacturer's agent for the southern industrial area.

—o—

W. F. Rochow has been appointed assistant to the president, Harbison-Walker Refractories Co., Pittsburgh. He will be in charge of the research and sales technical departments. He has been associated with the company since 1912, his work having been with both departments he now heads.

—o—

Wilber F. Pray has been appointed New York district manager for the Askania Regulator Co., Chicago. The New York office will be located in the General Precision Equipment Corp. Bldg., which firm is the parent company of Askania Regulator.

—o—

Raymond R. Rausch has been retained as a consultant on manufacturing for General Electric Co., Schenectady, N. Y., with headquarters in New York. He had been associated for many years with the Ford Motor Co., Dearborn, Mich., and had previously been general superintendent of the Timken-Detroit Axle Co., Detroit.

—o—

Harold Barrett, manager of the Indianapolis office of Ziv Steel & Wire Co., Chicago, will assume, in addition to the Indianapolis office, the managership of the Dayton office, which the company has opened at 351 Deeds Ave., Dayton, O.

—o—

W. A. D. Evans, consultant on electrical discharge lamps, Administration Division of the lamp department of General Electric Co., Schenectady, N. Y., has retired after 44 years' experience in lamp manufacture, and 29 years of continuous service with the company.

—o—

Lauriston S. Taylor, chief of the x-ray section, National Bureau of Standards, has been elected associate fellow in the American College of Radiology.

—o—

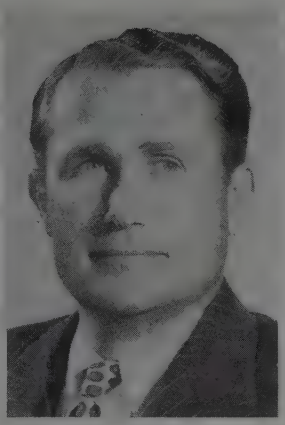
G. T. Morrow, vice president in charge of sales, Curtis Lighting Inc., Chicago, has been elected president for 1947-48 of the Chicago Sales Executive Club. He succeeds **Henry L. Porter,** Standard Oil Co. Other officers and the directors elected by the club are as follows: **Harold W. Dotts,** first vice president; **John C. Harkness,** second vice president; **Russell G. Davis,** treasurer; **Walter B. Peterson,** secretary; and directors, **Sanford H. Cundall, John A. Proven,** and **Floyd A. Poetzinger.**

—o—

J. P. Lewis has been appointed by the Edgar Allen & Co. Ltd. to an executive post at the Imperial Steel Works, Sheffield, England. Mr. Lewis, who is an associate of the Institute of Quarrying, will still be available for consultation. **G. N. Gee,** tool steel special technical representative for Edgar Allen & Co. Ltd., London, England, has been appointed to cover the specific territory of the southern half of England. His northern boundary will run roughly across England, north of Birmingham. **B. B. Green,** who succeeded **G. Hallam** as company representative in South Yorkshire, is, in addition, taking over the work carried on by the late **H. Woodhead** in connection with the sale of crushing machinery, etc., to collieries. **A. G. Griffiths** has been appointed assistant to Mr. Green. He will, also, be available for work similar to that of Mr. Gee, but in the area north of Mr. Gee's district.

—o—

L. L. Willfong, vice president and general manager, Earle M. Jorgensen Co., Forge Division, Los Angeles, celebrated his 50th anniversary in the steel industry on July 5. He began his career in 1897 in the forge shop of the Carnegie Steel Co., Homestead, Pa. After 20 years of forge shop experience in the Pittsburgh district, Mr. Willfong headed the Forge Division of the old Southern California Iron & Steel Co., and continued directing



ROBERT O. DEHLENDORF

Who has joined the sales staff of Jack & Heintz Precision Industries Inc., Cleveland. Noted in STEEL, July 14 issue, p. 79

COL. FRANK J. ATWOOD

Who has been named a vice president of Remington Rand Inc., New York. Noted in STEEL, July 14 issue, p. 78

H. W. BARTLEY

Appointed director of purchases for the National Enameling & Stamping Co., Milwaukee. Noted in STEEL, July 14 issue, p. 78

operations when it was absorbed by Pacific Coast Steel Co., and subsequently by Bethlehem Steel Corp. In 1942 the Jorgensen Co. bought a 1000-ton steam hydraulic forge press from Bethlehem, and Mr. Willfong took over the job of supervising the construction of Jorgensen's new Los Angeles plant.

—o—

J. Clyde Campbell has retired from Youngstown Sheet & Tube Co., Youngstown, after 52 years in the steel business. He joined Youngstown Sheet & Tube in 1902, starting as assistant paymaster and cost clerk, and later was employment manager. He finally joined the industrial relations department of the company.

—o—

Stanley C. Hope, president of Gilbert & Barker Mfg. Co., Springfield, Mass., has been elected president of Stanco Inc., Linden, N. J.

—o—

Frank J. Shanaberg has been named eastern district sales manager, American Welding & Mfg. Co., Warren, O. His territory embraces most of New England, eastern New York and Pennsylvania, and Washington, D. C. The company also announces that the eastern district offices have been transferred from 500 Fifth Ave., New York, to the Industrial Building, 1060 Broad St., Newark, N. J.

—o—

Richard M. Paxton Jr. has been elected a vice president of the Jessop Steel Co., Washington, Pa. He joined Jessop in 1924, and has served in various capacities in all of the company's production departments and laboratories. In March of 1927 he was transferred to New York, where for the past 20 years he has been in charge of Jessop's New York branch office.

—o—

B. E. Schroeder has been elected vice president of manufacturing of Hotpoint Inc., Chicago. During the war he had been general superintendent of the aviation motor plant of the Buick Motor Co., at Melrose Park, Ill., and since then he has been engaged in production management with Buick at Flint, Mich. **Patrick W. Ryan** has been promoted to general superintendent of Hotpoint, and **M. E. Maurer** has been promoted to general manufacturing engineer.

—o—

Chester W. Ruth, director of advertising for Republic Steel Corp., Cleveland, has been elected president of the Cleveland Advertising Club for the 1947-48 term. He succeeds the late **Clay L. Reely.**

—o—

P. Herbert Pasch, Turner Printing Machinery Inc., Cleveland, has been elected vice president and a director of the company. **Daniel F. Fisher,** for the past 12 years advertising and wholesale department manager, has been chosen a director and secretary of the company. Both men have been with the company more than 15 years.

—o—

Onni Lindfors, formerly a design engineer in the Electrical Division of Fairbanks, Morse & Co., Chicago, in the Beloit Works, has been appointed chief electrical engineer of the company's Freeport, Ill., plant.

OBITUARIES . . .

Clark M. Osterheld, 57, vice president of the McGraw Co., Chicago, and general manager of the Clark Division of the firm, died recently. He had invented and developed the Clark electric water heater. He joined the McGraw Co. in 1931 as consulting engineer, was promoted to director of research, and became vice president in 1945.

—o—

George E. Wilson Sr., 74, president and treasurer, Clinton Bridge Works, Clinton, Iowa, died July 11 in that city.

—o—

Alden C. Cummins, 59, general superintendent of the Youngstown plants of the Carnegie-Illinois Steel Corp., died July 10 of a heart ailment. He came to Youngstown in 1940 from Pittsburgh, where he had been assistant general manager for Carnegie-Illinois.

—o—

Frederic S. Wilhoit, 72, retired purchasing agent, Cutler-Hammer Inc., Milwaukee, died recently at his home in North Hollywood, Calif.

—o—

Henry Krumhansl, 49, for the last 20 years an accountant for Arthur McKee & Co., Cleveland, died July 13.

—o—

Robert W. Hunger, 58, purchasing agent for the Curtis Cos. Inc., Wausau, Wis., died recently.

—o—

William F. Blankner, 83, engineer and inventor of road-building machinery, died July 11, at his home in Cleveland. For the past 7 years he had been connected with the Hecker Engineering Co., Cleveland.

—o—

Edwin L. McKelvey, assistant to the general superintendent in charge of personnel at Cleveland, Jones & Laughlin Steel Corp., died July 10.

—o—

B. P. Carey, 53, vice president and general counsel of the Philadelphia Electric Co., Philadelphia, died recently. He had been associated with the company since 1913.

—o—

Harry W. Magee, sales representative, Philadelphia territory, American Equipment Division, Pittsburgh Screw & Bolt Corp., died recently.

Part Seven of a Series, Presenting Highlights on the 100 Year History of Broaching, Its Emergence Within 20 Years as an Outstanding Method on Difficult Work Involving Big Runs and Tight Limits, and Its Impact on Development of

By GUY HUBBARD
Machine Tool Editor, STEEL

PARADOXICAL though it may sound, broaching is one of the oldest methods of machining but at the same time is one of the newest production methods. As also is true of milling, to which it is related and with which it has within recent years become competitive, broaching originally belonged to the "filing family".

The first mechanically operated tool remotely resembling a broach which I have thus far been able to discover, was a rifling tool described and illustrated in a French manuscript on gun manufacture. This manuscript, dated 1770, was in the collection of Capt. Hugh Smiley. The tool in question was a multitooth block used instead of the usual single point rifling tool. It well could be considered as the forerunner of the broaching tools which armament makers finally got around to using for rifling guns during World War II.

Broaching—under its original name, "drifting"—first gained general acceptance about 100 years ago as a mechanical method for cutting keyways in bores of pulleys, gears, couplings, etc. It rapidly replaced the tedious hand process of chipping and filing keyways, which used to be a course that every apprentice had to live through. There were no broaching machines in those days. At first "drifting" was done by driving the tool through the work with a sledge hammer, which was tough on tool, work and operator.

One of the earliest records of machine broaching was the process developed by Richard Smith Lawrence, founder of the once famous Robbins & Lawrence Co., for "drifting out" the breech of the Sharps breech loading rifle about 1853. He used rack-operated arbor presses for this work and his methods were widely adopted with the general advent of breech loading guns in the 1860s.

For more than 50 years broaching was limited to the finishing of holes to shapes other than round. For example, they were squared, "hexed", serrated, and eventually multiple splines were cut. Those operations still are highly important, especially on automotive and aircraft work, where accurate multiple splining is of utmost importance.

The first broaching machines were modeled after rack-type arbor presses and their operation was attended

by considerable chattering and groaning—some of which was due to the shortcomings of the machines, but much of which was due to lack of adequate tool engineering "know-how" on the part of broach designers. One of the big steps ahead was made in 1901, when J. N. Lapointe introduced the screw-type broaching machine, with operating smoothness, stamina and power to permit real accuracy and speed in production broaching of internal work.

I have had some very interesting conversations with Francis Lapointe regarding the trials and tribulations which he and his father went through in designing, cutting and, above all, in hardening and tempering broaches for their early production broaching setups. There was little or nothing to go on in the way of prior art. They simply had to use ingenuity and common sense—plus trial and error methods—to create the art as they went along.

Those men, their contemporaries and their successors, deserve tremendous credit for laying the foundations for a new tool engineering and production technique which has gained wide acceptance and has still wider possibilities. They were—and are—typical of the pioneering spirit which has made the American machine tool industry what it is today.

Broaching is unique in that it reached a high stage of development in one phase—that of internal work—only to blossom out in a new phase of still greater importance. I refer to "external" or "surface broaching". As far as most of us machine shop men were concerned, surface broaching came into the limelight at the National Machine Tool Shows at Cleveland in 1927 and 1929. Its advent was closely tied up with the advent of hydraulic actuation of machine tools, a system which lent itself with particular advantage to the pushing or pulling of large broaches such as are involved in exterior operations.

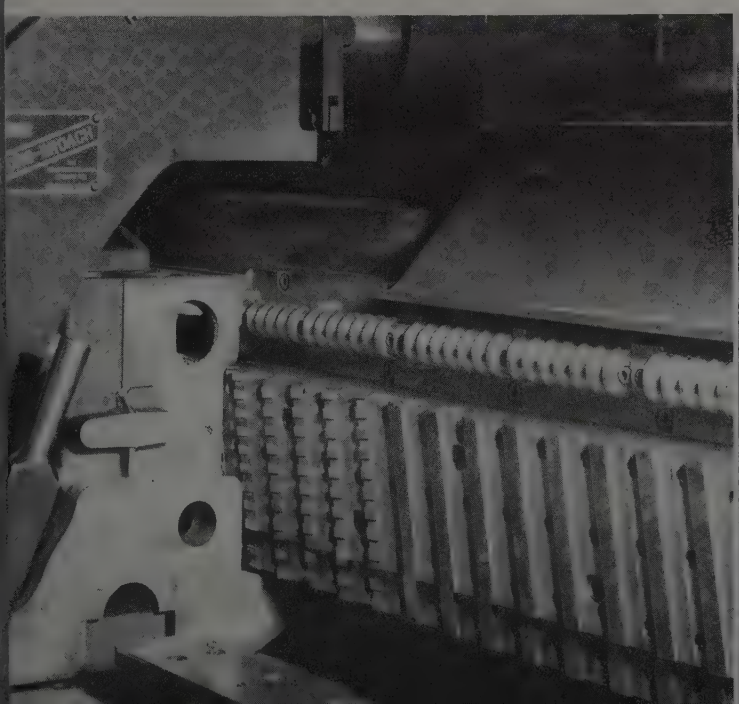
Actually, the beginnings of surface broaching long antedated those Shows. As early as 1882 an inventor named Cosgrave brought out a machine for such work. In 1888 M. E. Canfield of Pittsburgh introduced a process for broach roughing and finishing of wrench jaws. Similar isolated cases existed in New England tool and hardware plants more than 40 years ago. The process never really caught on, however, until the time of the National Machine Tool Shows of about 20 years ago. Until then, industry wasn't ready for it nor was it ready for industry. Following its "mass introduction" to industry through the medium of those Shows, machine tool builders and tool engineers have had to keep stepping to keep pace with industry's demands for surface broaching machines, surface broaches and standard and special fixtures for handling work ranging all the way from small pliers to big cylinder blocks.

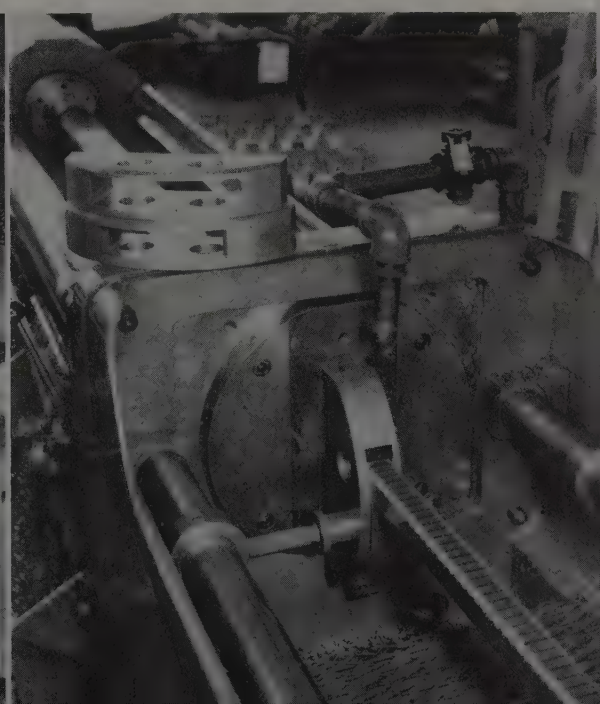
To all intents and purposes a new industry has grown up within the machine tool industry, and a new "school" of tool engineering has been established to cope with the situation. The end result very definitely has been "more and better and less costly things for more people" and "the end is not yet" because the good work goes on at an increasing tempo. Metallurgists have contributed much to this good cause, through improved cutting materials and improved methods and equipment for hardening and tempering large broaches—many of which represent an

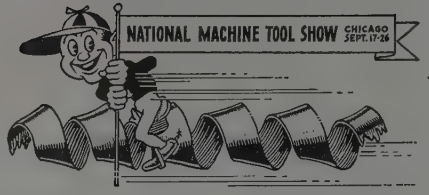
Left—Typical automotive application of production broaching in which a multiple splining operation is handled in a dual-ram vertical machine which loads at one position while cutting in the other. Photo courtesy Chevrolet Motor Division

Below, at left—Cylinder block surface broaching in a Cincinnati horizontal Hydro-Broach machine. Surfaces for inspection plates, tappet covers and half-round supporting groove are machined at one pass. Photo courtesy National Broach & Machine Co.

Below, at right—First in a series of five broaching operations involved in precision mortising of aircraft engine counterweights, following rough milling. Two fixtures and four broaches complete the job. Photo courtesy Colonial Broach Co.







Broaching in general, and external surface broaching in particular, gained only slight recognition as a production process until the National Machine Tool Shows held in Cleveland in 1927, 1929 and 1935.

New machines—including hydraulic designs—new types of large broaches and new methods of handling work, introduced at those shows, won for production broaching a degree of recognition which otherwise would have required years to achieve.

When the first National Machine Tool Show since 1935, is held at the Dodge-Chicago plant, September 17-26, 1947, sweeping effects of 12 long years of ingenuity will for the first time become fully apparent to men of the metalworking industry.

investment of several thousand dollars prior to heat treating. There no longer is any room for "rule-of thumb" methods in big business such as that.

The basic principle of broaching is that cutting action is divided up among a large number of teeth, this progressive action being attained by having the teeth of gradually increasing height from the roughing to the finishing end of the tool. Ordinarily, while these teeth are at work there is no place for the chips except between the teeth. Therefore it is necessary, especially on long work, to have ample chip room between the teeth, also to design the teeth so that the chips will curl up like watch springs.

Obviously one of the fundamental principles in broach design is to divide up the cut so that no single tooth or group of teeth ever will be overloaded. Otherwise the action of the tool will be similar to that of a milling cutter whose feed suddenly is jumped up at some one point in its passage through the work. Incidentally, a smashup with a broach is more catastrophic than with a milling cutter because of the high cost of broaches as compared to milling cutters. Comparative cost of the tools, however, is no criterion to comparative cost of work done by the tools over a period of time—assuming that through care in handling the tools live out their useful life span.

It is my profound conviction that broach engineering is no place in which amateurs should attempt to practice. Even in such simple tools as those for cutting single keyways, squaring and "hexing" holes, etc., my sincere advice to you is, get expert broach design and manufacturing service from companies specializing in that business, rather than attempt to have that work done in your own toolroom.

The specialists will do the work better and cheaper—and this is absolutely no reflection on your own good toolmakers. Just bear in mind that few companies in production work these days attempt to make their own twist drills and milling cutters. Remember that variables which must be considered in designing broaches are much more numerous and puzzling and are far more fatal if misjudged.

Following are some suggestions made by my friends at Illinois Tool Works as to information which you should give the broach specialist before he tackles your problem:

(1) Length of cut and amount of material to be removed.

(2) Analysis and type of material to be operated on—for instance, rolled stock, forgings or castings.

(3) Hardness of that material.

(4) Quantities involved in your production runs.

(5) Whether broaching is to be done before or after heat treating.

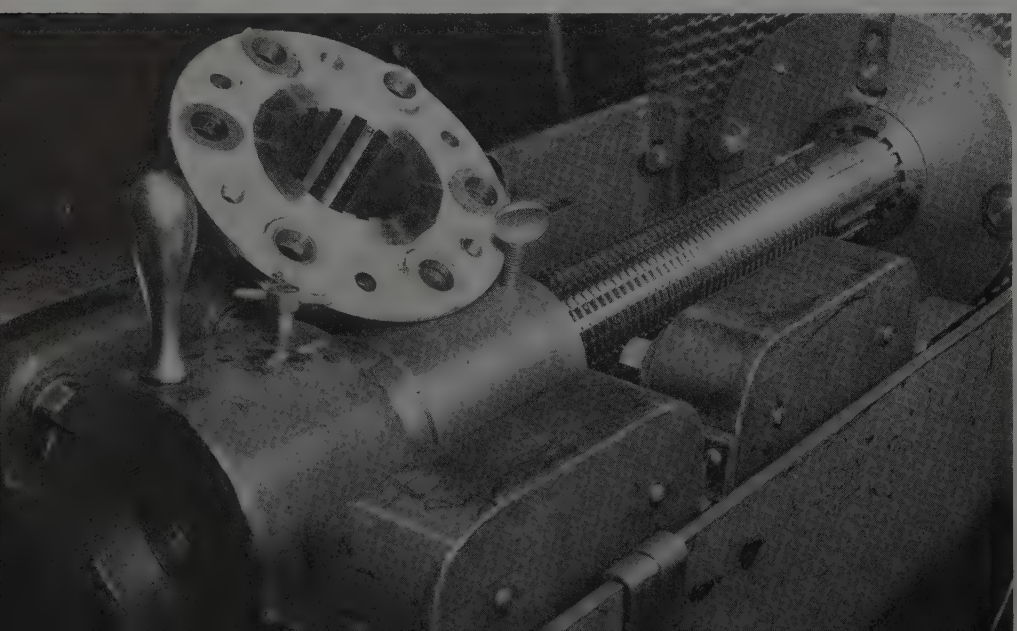
(6) Tolerances required on all broached surfaces.

(7) Type and full specifications of the broaching machine on which the setup is to be made.

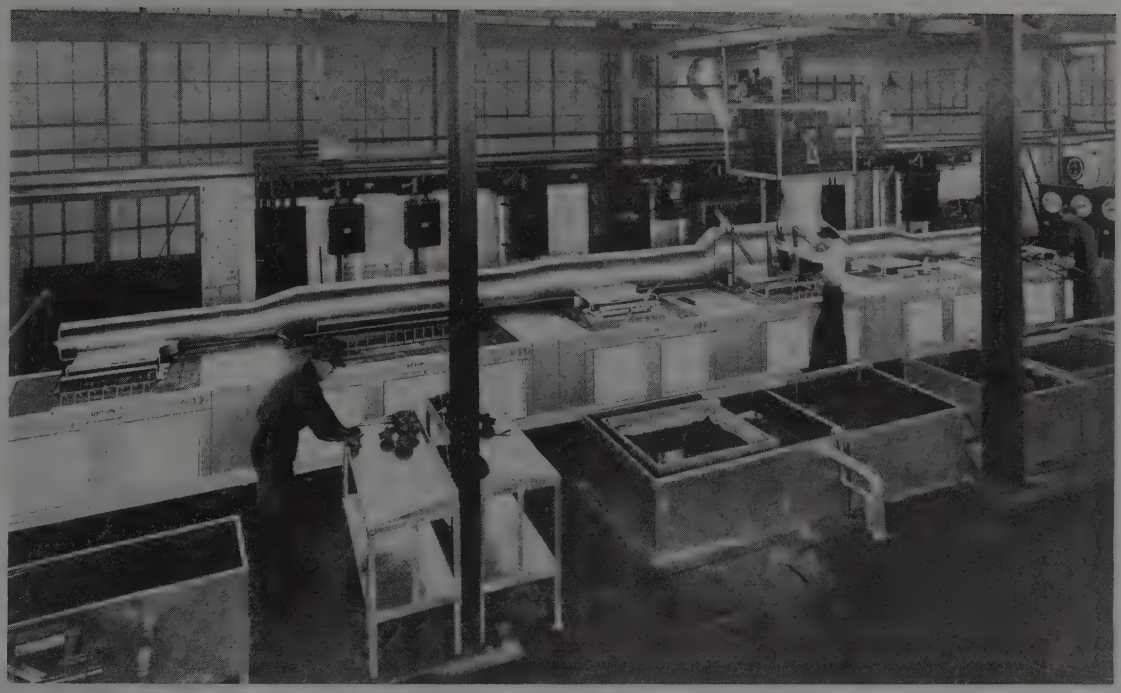
(8) Description of adapters and holding fixtures, in case these already have been designed and built.

(9) Lubricant or coolant to be used.

While broaches can be designed from drawings of a workpiece, it is much better to (*Please turn to Page* 128)



Multiple splining of reduction gear hubs for aircraft engines, in Lapointe horizontal machine. This work must be held to limits of plus or minus 0.0002-in. which means that such precision must be built into broach and fixtures. Photo courtesy Pratt & Whitney Division of United Aircraft Corp.



VARIOUS TYPES OF *Heat Treating* HANDLED IN ONE INSTALLATION

FURNACES capable of doing virtually any type of heat treating work in the temperature range from 300 to 2500° F was one of the demands put upon equipment installed in the Dayton, O., plant of Dayton Forging & Heat Treating Co. In addition, it was to have a capacity of 500 lb per hour for each furnace; the work was to come out clean, scale-free, have exact physical and metallurgical characteristics required and the intricate product, after treatment, was to emerge from the furnace without distortion.

After weighing these considerations, it was decided to install liquid salt bath furnaces as their performance was expected to meet the above demands. Furthermore, it was thought that furnaces should operate without shutdown for any reason, and that they should operate automatically as to heat control to insure results demanded.

To meet the above considerations, six furnaces were installed. These are identified as draw, isothermal quenching, preheating and neutral hardening, high speed high heat, quenching and natural hardening and carburizing, and were supplied by Upton Electric Furnace Division, Detroit. With this single battery of equipment all the various types of work could be heat treated in one department, including hardening and drawing, isothermal treatments, high speed and high carbon high chromium steel using double preheat, stainless steel treatment, liquid carburizing and cyaniding.

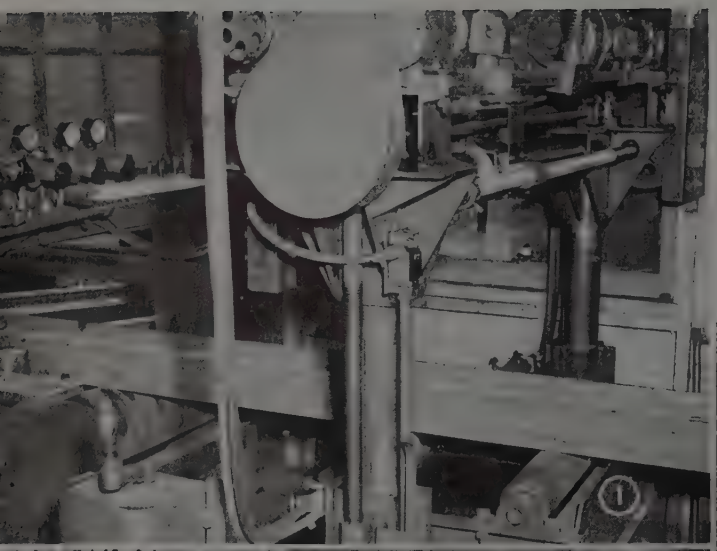
Each furnace was built with relatively small surface opening but to an unusual depth to accommodate work of unusual size, and to permit treating that work in a vertical position, thereby reducing distortion or warping. Surface sizes of all but the isothermal furnace measure 27 x 9 in., this one measuring 30 x 60 in. (second furnace from left in photograph). All have a depth of 54 in., but being installed below the floor line, they project only 30 in. above.

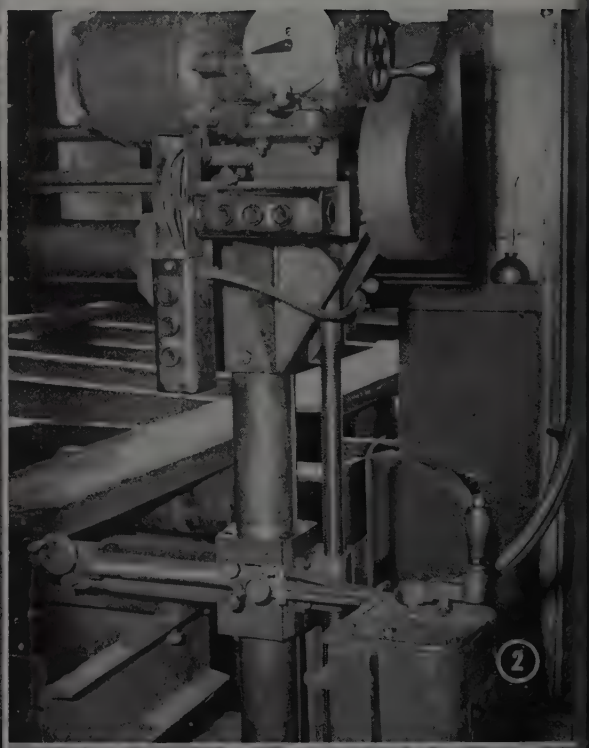
Reason for the unusual surface sizes of the furnaces is the location of the electrodes at the bottom, entry being made through the brick work at the extreme bottom of the pot from opposite sides of the furnace. They extend only to a point where they are flush with the inside surface of the pot so that there is considerably reduced danger of shorting or burning work should it be dropped. Top of the furnace is entirely clear.

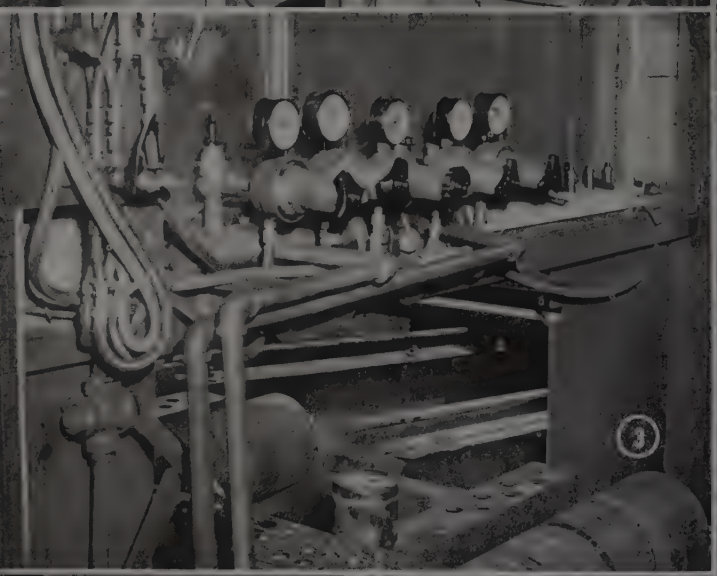
With the restricted surface area, heat radiation from each pot is said to be sizeably (*Please turn to Page* 142)

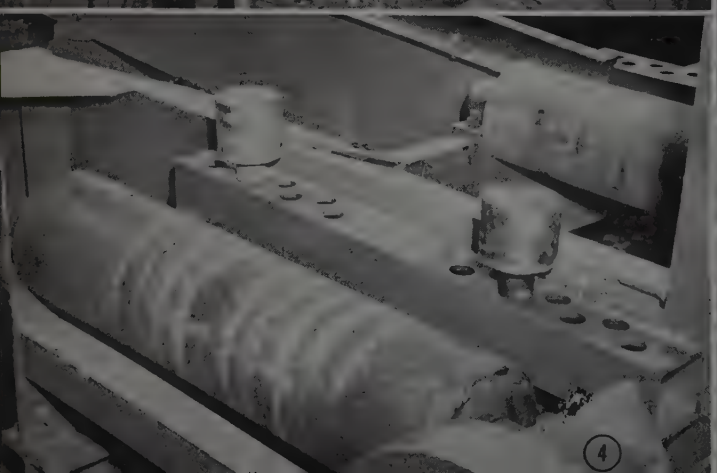
Structural Shapes

In Quantity









LARGE quantities of structural I and H-beams and channels are flame cut at controlled speed range of 4 to 24 in. per min on new equipment designed and built by Standard Steel Construction Co. Ltd., Port Robinson, Ont., it was learned through The Linde Air Products Co., New York. Accurate square and mitre cuts and ease of handling all sizes of sections were principal factors affecting design and layout of the machine, shown in action in the accompanying illustrations.

Cutting equipment consists of three C-39 blowpipes mounted on Acme screw drives. Variable speed control for the drives is supplied from ¾-hp motors driving through Link-Belt AM ½-PIB units. A single speed reducer operates the vertically driven blowpipes and a separate PIB unit drives the horizontal blowpipe.

Fig. 1 is a rear view of machine, with regulator bank in background, roll table in left foreground, an H-section on rolls ready for cutting. Roll table is driven by a 5-hp motor through V-belts and a standard valve speed controller. Upright supports and drive screws with drive motors are shown in middle and upper right. Vertical roller in middle left serves to keep sections centered on roll table, a very important requirement in mitre cutting.

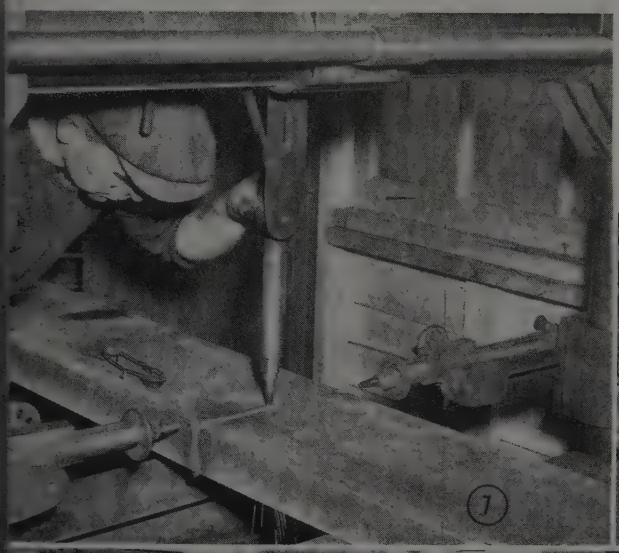
The two middle rollers are enclosed at bottom to hold water for slag cooling and eventual disposal. These two rollers and machine are on a turntable for swinging machine to desired angle for mitre cutting.

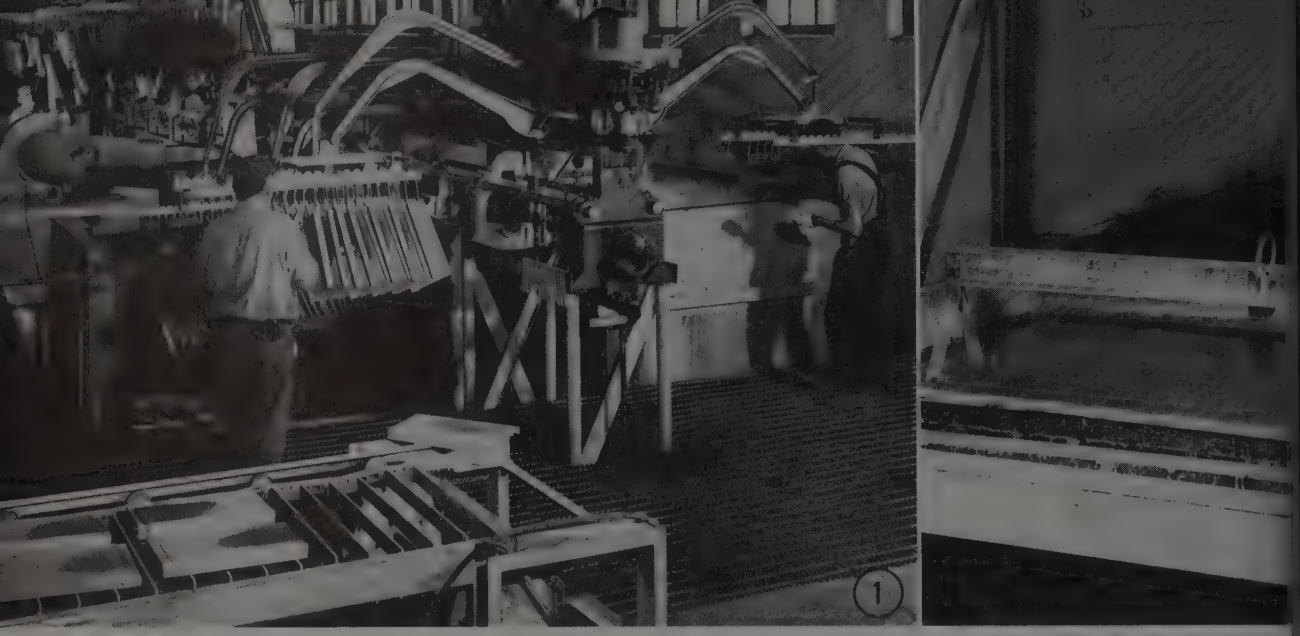
Right hand drive mechanism with electrical switches and motor speed adjustment dial are shown in Fig. 2. Cutting oxygen and preheat valves will be placed in space below and to the right of the electrical switches, in order to concentrate all controls in one place. Regulator bank and valve controls are shown in Fig. 3. Again the vertical roll and method of holding for various widths of sections are seen. Air valve controlling ejectors are in left center. Note measuring tape and stop holes.

Vertical rolls, Fig. 4, are easily moved from hole to hole centering various widths. Approach rolls also appear here. Fig. 5 shows kick-off arms in raised position for transferring pieces from roll table to skids. Vernier type holes in stop and slide, Fig. 6, permit adjustments to 1/16-in. Note H-section against stop.

Structural shapes pass through the machine with vertical blowpipe held in raised position. On channels, flanges are cut first, from bottom to top. Blowpipes are run down while the web is being cut in order to be in place for the next channel cut. Fig. 7 shows channel web being cut; cut is started in kerf formed by blowpipe making flange cut.

Next, the channel is rolled out beyond the raised stop and ejected by kickoff arms onto skids. Compressed air kick-off piston operated from the control position permits remote control handling of cut material. Fig. 8 shows typical ends of flame cut structurals.





By G. H. McINTYRE
Vice President and Director of Research
Ferro Enamel Corp.
Cleveland

PREPARING

For Porcelain Enameling

Importance of good nickel flash in lowering rejects and insuring generally good enameling qualities of all types of steel cannot be overstressed. Proper nickel deposit improves bonding range of ground coat, minimizes copper beading and fishscaling by reducing overactive oxidation characteristics of steel

IN SPITE of the steel industry's high production schedules there has not been sufficient sheet available to meet general fabrication requirements. This situation has been of particular concern to the porcelain enameling industry, as enormous tonnages of low carbon special sheets have been considered essential for best enameling qualities.

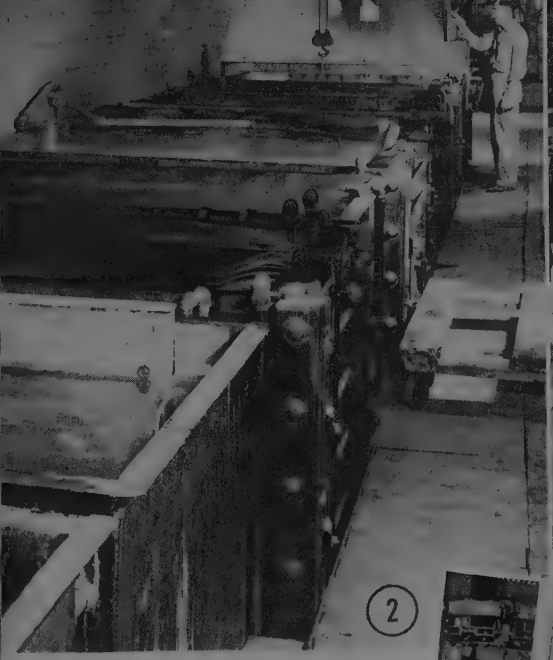
Porcelain enamels are glasses fusible to iron at temperatures ranging from 1480° to 1600° F; hence, the impurities in the structure and on the surface of the steel sheet are of prime importance both for surface quality and for freedom from warpage. Under these present circumstances many important advances are being made by the steel producers, the enamel frit manufacturers and the enamelers.

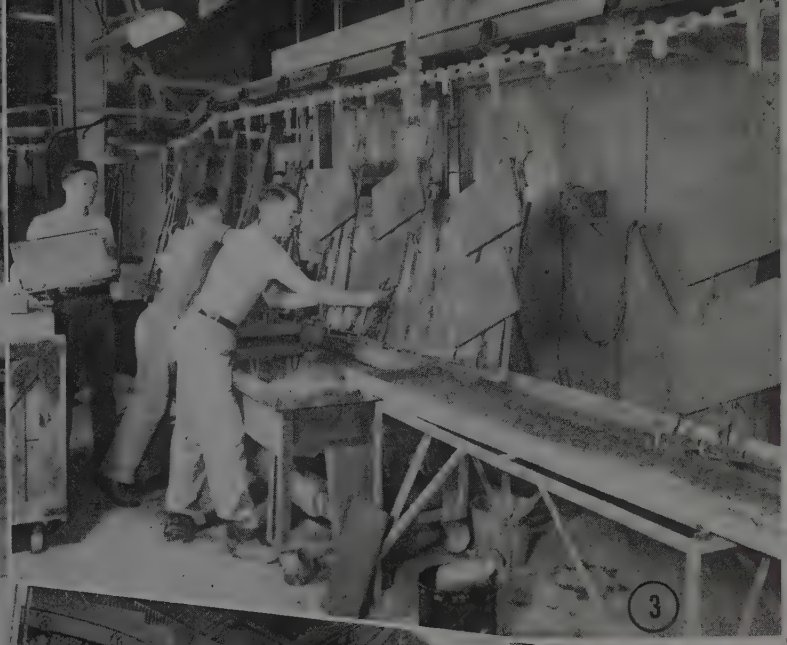
Results of these researches and the need for production under any circumstances are gradually changing the thinking of the industry. The steel companies are experimenting with newer types of sheet for enameling, such as titanium bearing steels and electro-plated cold rolled sheets. The plated sheet should have the advantage of requiring no pickling by the enameler as long as no heavy weld scale is present and the plated coating made uniform, thus insuring uniform bonding qualities.

Frit manufacturers are developing enamels of lower maturing temperatures and enamels that can be applied in much thinner coatings thereby decreasing tendencies toward excessive warpage. Better cleaning and pickling operations with good technical control are being practiced by the enamelers thus insuring fewer surface defects. These improvements in methods and materials are making it possible to speed up production and to secure satisfactory results under normally adverse conditions. The knowledge gained will continue to benefit the industry even when steel is more readily available.

Steel Differences: All mild steels and enameling iron are made by the basic open hearth process; the principal purpose of which is to eliminate most of the alloying elements and metalloids which are present in the raw materials of the furnace charge. In general, enameling iron will be low in carbon, manganese, phosphorous, sulphur and silicon as compared to the same elements in mild steel. Carbon content is of utmost importance in enameling iron. It will be approximately 0.03 per cent (as compared to 0.10 to 0.20 per cent in mild steel), mostly in the combined form as carbides, instead of free graphitic carbon.

(*Please turn to Page* 112)





STEEL

Fig. 1—Automatic pickling machine

Fig. 2—Batch type pickle room

Fig. 3—Ground coat dipping

Fig. 4—Continuous firing of cover coat on pressed steel bath tubs

Fig. 5—Mill room for grinding porcelain enamel

Fig. 1—Group of three turbine blades brazed together and ready to be finish machined for insertion on a rotor

Fig. 2—Commercial atmosphere furnace employed for batch-type brazing work. Dissociated ammonia gas is employed as protective atmosphere

Fig. 3—Photomicrograph of section across brazed joint surfaces facing joint were oxidized, copper-brazed at 1100° C, X500

Fig. 4—Cupaloy brazed joint, brazed at 1100° C, X500. Start of an intermediate alloy layer between 0.4 per cent copper alloy and the chromium steel can be distinguished with but slight penetration into grain boundaries

Fig. 5—Cuferco brazed joint, brazed at 1100° C, X500. Cuferco is a copper alloy containing 2 per cent Fe, 2 per cent Co. There is but slight penetration of grain boundaries by the brazing alloy and more evidence of a gradual diffusion of brazing alloy into the chromium-steel

By T. H. GRAY
Research Engineer
Westinghouse Research Laboratories
East Pittsburgh, Pa.

Furnace Brazing

12 PER CENT CHROMIUM LOW CARBON STEEL

Tests in joining blades of steam turbine rotors in order to modify their mechanical behavior reveal that by controlling brazing temperatures, 50 to 100 per cent stronger joints are made. Turbine with brazed blades operated for 1000 hours at 932° and 1250 psi without failure

SERIES of brazing tests on specially prepared 12 per cent chromium, low-carbon steel specimens has shown that by properly controlling the brazing conditions, joints could be made that were 50 to 100 per cent stronger than had been obtained in the past. The tests were made in connection with joining blades of steam turbine rotors into groups as shown in Fig. 1 in order to modify their mechanical behavior. Such an application had promised a notable increase in turbine performance provided the brazed blades could successfully withstand operating temperatures and the effect of high frequency alternating stresses.

Physical tests were made to evaluate the variables that influence the strength and quality of brazed joints, for example: Joint spacing, composition of brazing alloys, oxidation of the joint surfaces and preparation of the surfaces. It was found that increased strength is possible in brazed steel joints by observance of good brazing practices, including: 1. Minimum spacing, 2. capillary feeding, 3. brazing metals of oxygen-free copper or copper-base alloys, 4. avoidance of sandblasted or other types of contaminated surfaces, 5. furnace atmospheres of high purity. Observance of these practices provided brazed joints more than 50 per cent stronger than those hitherto reported in commercial practice as summarized in Table I.

Before attempting the brazing of turbine blades, a considerable amount of spade-work was done on evaluating the effects of the following variables, both at room temperatures and at elevated temperatures: 1. Furnace atmospheres, 2. oxidation characteristics of the blade material and brazing alloy, 3. surface preparation, 4. joint spacings, 5. method of feeding the brazing alloys, 6. composition of brazing alloys.

Furnace-brazing in a controlled atmosphere was necessary in order to eliminate the need for fluxes, provide for uniform heating and cooling to eliminate residual stresses arising from thermal gradients, and to supply a repeatable uniform mode of brazing procedure. The study was confined to a low-carbon chromium-steel of the following composition (in per cent by weight): C—0.11, Mn—0.42, P—0.021, S—0.019, Si—0.24, Cr—12.29, Ni—0.31, Mo—0.57, Fe—Balance.

Physical properties of the steel in the annealed as well as in the tempered state are shown in Table II.

Strength of Commercial Copper Brazed Joints: The strength of furnace brazed joints, particularly of readily oxidizable materials such as high chromium steel, or for that matter, any steel, has been found to be variable because of differences of method, skill and care employed in the performance of the brazing operation. The variances to be expected are indicated by Table III which shows results of tensile tests of copper brazed joints as reported by several authors. These results also furnish a basis for comparison with the joint strengths obtained by the methods to be described in this article.

Normally the commercial furnace-brazing of steel parts include the following operations: 1. Abutting surfaces are finish-machined or surface ground and cleaned to remove any films of oil or foreign matter; 2. component parts are held in position by gravity, pins or clamps or other suitable means; 3. brazing metal in the form of thin foil or wire is placed within or around the joint so that when the metal melts it will flow into the joint by gravity, capillary action or both. Fluxes are required when protective atmospheres are not used. 4. The assembled parts are placed within the brazing furnace, brought to temperatures 15-20° C higher than the melting point of

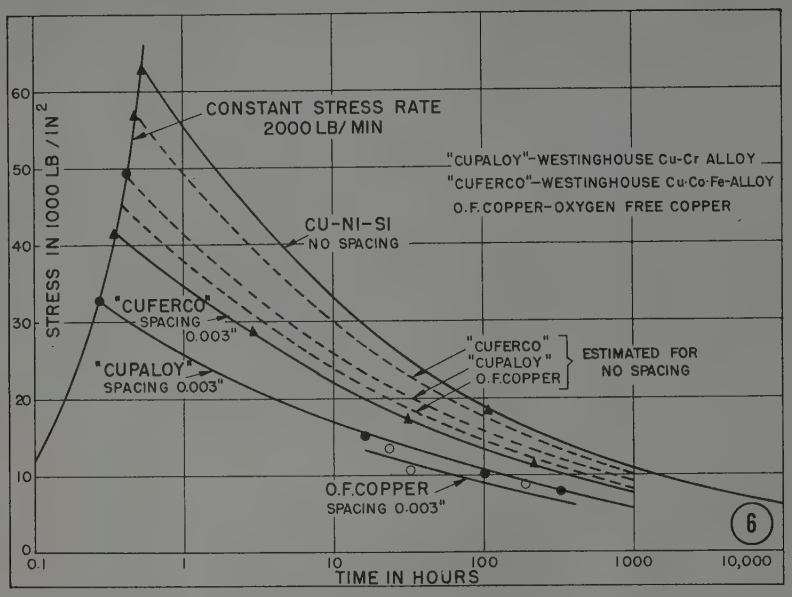


Fig. 6—Rupture tests on brazed joints at 932° F

Fig. 7—Methods of applying brazing alloy to turbine blade joints

brazing metal and held for a time sufficient to bring the assembly uniformly to that temperature. For copper brazing, temperatures near 1100° C (2012° F) are used. Incidentally, such temperatures are near the upper limit of temperature for most commercial resistance furnaces.

Experimental Procedure: A Westinghouse controlled-atmosphere electric brazing furnace was utilized for the brazing and heat-treatment of the specimens. Dissociated ammonia atmosphere circulated through the gas-tight Inconel muffle and protected them against oxidation. A furnace similar to the one in which the brazing here reported was done is shown in Fig. 2.

When assembled, the specimens were mounted on a tray with the joint surfaces horizontal and pushed into the water-jacketed ante-chamber of the furnace. They remained here for 10 min while the atmosphere was purged. The specimens were then moved into the hot zone, heated to a temperature of 2012° F (1100° C) for 20 min before being returned to the cooling chamber. They were cooled for 30 min before removal from the furnace. The dew point of the furnace atmosphere was checked continuously during the brazing cycle to insure that it would not rise above minus 40° C.

After the specimens were brazed, their hardness was approximately 58 rockwell C. They were tempered, therefore, in a forced-circulation air tempering furnace at a temperature of 1050° F (565° C) to reduce the hardness to 30 to 34 rockwell C to enable the machining of test pieces. Tensile test pieces were machined from the brazed blocks.

Furnace Atmospheres: The function of a protective furnace atmosphere is to minimize the free oxygen concentration and to reduce chemically to the metallic state whatever oxide films are present, as indicated by the equations (1):

$$Fe_2O_3 + 3\ H_2 \rightleftarrows 2\ Fe + 3\ H_2O$$

$$Cr_2O_3 + H_2 \rightleftarrows 2\ Cr + 3\ H_2O$$

Of the several gases which may be employed satisfactorily for furnace atmospheres, previous investigations have

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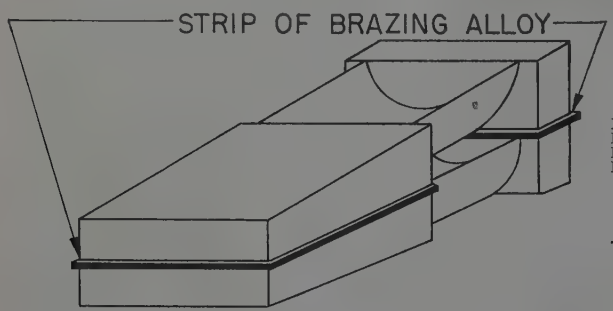

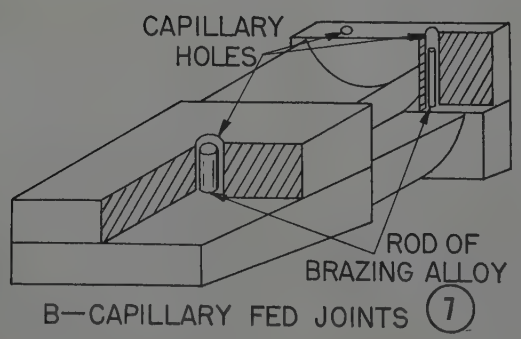

TABLE I
IMPROVEMENT IN JOINTS STRENGTH

Procedure	Brazing Alloy	Brazing Temp. C	Test Temp. C	PSI	% Improvement
Previous (A)	Copper	1100	Room Temp.	75,000	
Present (B)	O.F. Copper	1100	Room Temp.	125,000	66
Previous (A)	Copper and	1100	482	34,000	
Present (B)	Copper Alloys	1100	500	63,000	85

A—Commercial practice.
B—Improved procedure described in this report.

TABLE II
PHYSICAL PROPERTIES OF 12% CHROMIUM-STEEL

	As Annealed	As Hardened and Tempered at 1050 F
Ultimate Tensile Strength	112,250 PSI	140,000 PSI
Yield Point	80,000 PSI	135,000 PSI
Elongation in 4D	23.4%	20%
Reduction in Area	67.1%	69%
Brinell Hardness	229 BHN	340 BHN
No 1211		

TABLE III
STRENGTHS OF COPPER-BRAZED JOINTS

Brazing Alloy	Ult. Ten. St. PSI, Room Temp.	Ult. Ten. St., PSI 900 F	Ult. Ten. St., PSI 932 F
Chile Copper (1)	72,000		30,000
Commercial Copper (1)	50,000–110,000		30,000–38,000
Commercial Copper (2)	38,800–119,000	32,000–39,000	
Commercial Copper (3)	50,000°		
Commercial Copper (4)	60,000–105,000		

(1) Westinghouse Research Laboratory Data.
(2) "Properties of Brazed 12% Chrome-Steels", F. C. Kelley, *Iron Age*, November 2, 1939.
(3) "Engineering Physical Metallurgy," R. H. Heyer, D. Van Norstrand Co. Inc.
(4) "The Effect of the Physical State of Steel Upon the Tensile Strength of Brazed Joints", F. C. Kelley, *Welding Journal*, February, 1941.
° Manganese Bronze Brazing Alloy.

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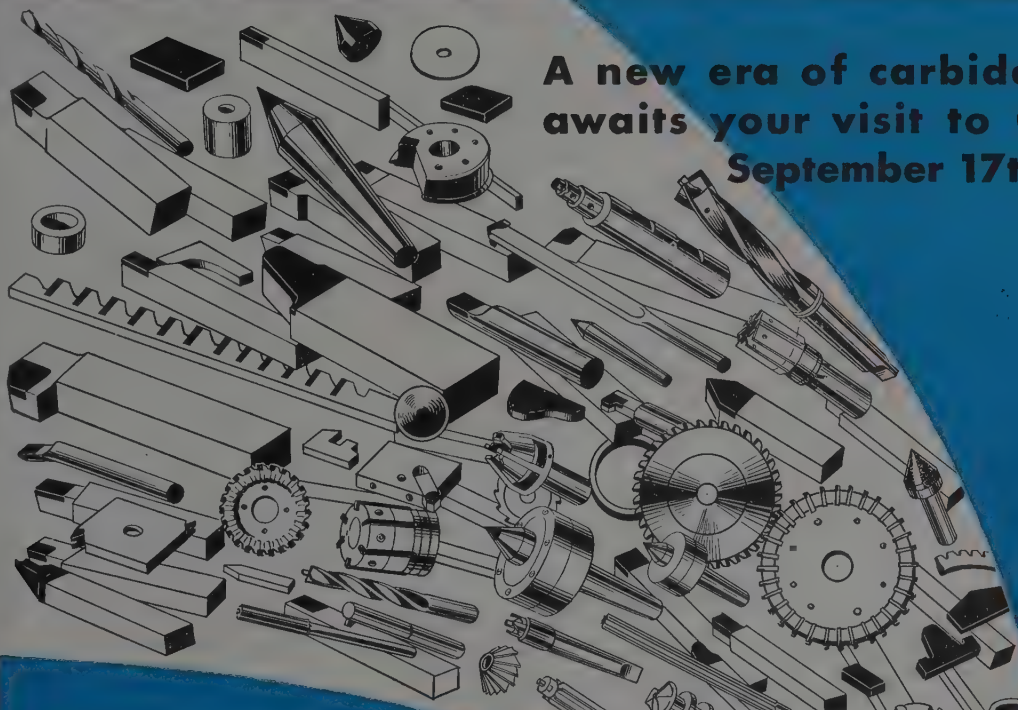

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Engineering News *at a Glance*

HYDRAULIC BULLDOZERS: In Peoria, Ill., Caterpillar Tractor Co. reveals that hydraulic controls are incorporated in its latest earthmovers. Designed similar to the cable-controlled bulldozers, the machines provide rapid blade action for adjustments in meeting varying work conditions. In three of the models, the hydraulic cylinders are mounted immediately over the push arm, and are positioned alongside a new engine guard extending from the radiator guard in front of the pump housing. Cylinders of the fourth model are mounted on box section brackets located alongside the operator's seat, with power of the pistons transmitted to the push arms through action of connecting triangular cranks.

PLANS LARGER PLANT: Vertical induction motors are now being made at a substantial rate in General Electric's San Jose, Calif., plant, which was converted from an ice-skating rink to help meet the demand for motors. Plans, however, are now under way for construction of a $2 million factory at the same location to permit further expansion of motor manufacturing facilities. The present plant recently turned out its thousandth motor.

COMBINES POWER PLANTS: In Pittsburgh, Westinghouse recently developed a new jet engine—the Yankee 24-C—which in combination with a 1300 hp conventional engine is slated to give the Navy's newest interceptor fighter an extremely high sustained rate of climb. Action of the conventional engine turning a propeller in the ship's nose, and the jet unit discharging through the tail, combine to provide the plane's 500-mile-per-hour speed. The 24-C is the fourth turbo-jet power plant developed thus far by the company.

FAST SQUEEZERS: Food Machinery Corp., Riverside, Calif., recently developed an automatic juice-extracting machine of a revolutionary character. During its first public exhibition at the San Bernardino national orange show in March, the juicer squeezed some 480 oranges per minute. According to the *California*, the machine proved capable of turning out 300 gal of orange juice per hour.

FIFTY-TON CONVERTERS: Declining supplies of high-grade iron ores in Europe may increase the importance of the bessemer process, British investigators reported recently to the Office of Technical Services, Washington. While 25 and 28 tons capacity has long been standard for German installations, recently built 50-ton vessels are giving good results. German experts state that by using a shallow converter bath, the nitrogen content of the steel can be reduced appreciably. Quality of this basic bessemer steel is high enough so that it often could be substituted for open hearth steel during the war.

DIRECT-INDIRECT LIGHTING: Two-hundred-watt bulb recently developed by Sylvania Electric Products Inc. supplies both direct and indirect lighting without the use of supplementary equipment. Providing its own diffusion, it is designed so it screws into a socket, base down. Top or flat end of the bulb is frosted to furnish upward diffusion without too much loss of light. Its lower portion has an opalescent coating to provide greater diffusion of the light falling on work surfaces.

NO OXYGEN FOR CUTTING: Warborn method for cutting and welding metals with flame that uses no oxygen is covered by a newly issued patent assigned by its inventors, H. F. Priest of New York, and Dr. A. V. Grosse of Marcus Hook, Pa., to the Office of Scientific Research and Development. The two engineers use a unique combination of gases, fluorine and hydrogen, to get oxygenless flame of very high temperature—about 4000° C. This readily cuts copper. It also is good for welding because of the instant formation of copper fluoride which serves as a flux, protecting the metal at once against oxidation, and corrosive effects of the fluorine gas itself.

MEASURES ALL TWISTS: In Lansing, Mich., it was learned, Oldsmobile Division, General Motors Corp., recently installed a new torsion and strength testing machine for checking torsional parts of Oldsmobile cars. It measures all degrees of twist, and increments of stress loading up to the point of failure of the specimen, twisting capacity of the machine ranging up to 120,000 in. lb. Speed of twisting force ranges from 2 to 180 degrees per minute, and is controlled through electronic controls and an electronic variable speed motor. Speeds of infinite selection up to 180 degrees per minute can be accurately maintained within 1 degree, plus or minus. Maximum length of solid bar specimens to be tested is limited to 5 ft 4 in., and 3 in. diameter, or its equivalent. The equipment at present is used by the process engineering department for testing axle shafts forged in the Lansing plant.

SPOTS MINUTE DIFFERENCES: Differences to within three-millionths of an inch—or a thousand times finer than a human hair—are measured by an electronic gage now being used in Philadelphia by SKF Industries Inc., to inspect tiny steel bearing rollers. The device, resembling a combined futuristic radio set and pin-ball machine, sorts rollers into six groups of sizes, each differing from the other by only 20 millionths of an inch. As each roller passes through the gage a sensitive pickup relays its measurement to an electronic circuit. Differences in current determine proper size group into which the roller automatically falls. The gage itself is currently manufactured by Foot Pierson Co. exclusively for Federal Products Corp. of Providence, R. I.

GAS TURBINE THAT REVERSES: In Washington, it was learned, O. R. Waller of Trenton, N. J., recently patented a reversing gas turbine in which flow and temperature of the driving gases do not fluctuate during reversal. It is said to be peculiarly well adapted for use in ship propulsion. Patent rights are assigned to De Laval Steam Turbine Co. Driving gases in the development are supplied through a ring of nozzles set at an angle for forward motion. The turbine also includes a second ring with nozzles pointed at an opposite angle. Both rings are movable—to reverse the forward drive, nozzles are pushed out of the way, and at the same time the reverse nozzles are brought to bear.

BIG ELECTRICAL YEAR: Electrical industry faces one of the biggest years of development in its history, having added 1,750,000 new customers in 1946 and anticipating an addition to power lines of two million more this year. Lifting of four years' restrictions on purchase of equipment by power systems released a tremendous pent-up demand for equipment. According to Allis-Chalmers *Annual Review* representative of this is a transformer demand that has skyrocketed many times above that of 1941, the biggest year of expansion to date. Significant in the preferences of new transformer purchasers, the publication points out, is a definite trend toward use of 3-phase transformers in larger sizes. Great interest also is being shown in 3-phase regulators and their combination with 3-phase transformers into one unit.

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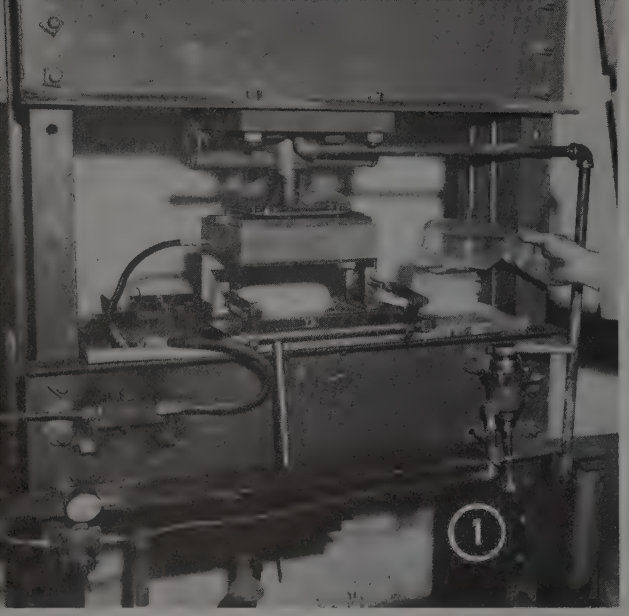


Office Machine Production

Simplified by Compressed-Air Operated Devices

COMPRESSED air is employed in virtually every production step in the manufacture of a new type of shorthand machine being undertaken by Kirk Brevitype Corp., San Diego, Calif. Combining written shorthand, typing and machine shorthand into a simple, fast method of taking dictation, the machine is being manufactured in a newly equipped building, formerly the cafeteria of a large aircraft plant. Gas piping system throughout the cafeteria was converted to an air distribution system with outlets at all machines and working areas.

One of the examples of compressed air applications may be observed in Fig. 1. A press has been converted to air operation to obtain faster and more economical production in forming the plastic cover for the machine. The cover is placed over a male form and the die is pressed over the plastic by an air piston. At the same time this pressure is applied, compressed air entering the die at the side acts to push the piece being formed out against the die so the piece will be accurately formed. One valve, which may be seen just below the worker's hand in Fig. 1, regulates both the piston and the air which forces piece against the die.

On first operations, a female die was used. However, the change to the male die gave better production results by eliminating dust specks and bubbles from the process. The press employs clamps because of the opposing pressures within the machine. Conversion of the press to air operation was an initial economy and everyday operation reportedly has been found to result in another economy because of the faster operation possible.

The Brevitype machine, which was invented by Wendell V. Kirkpatrick, San Diego business school operator, uses the alphabet rather than shorthand symbols. Many of the production problems were entirely new, so new devices had to be worked out. Typical of some of the simple but effective tools is the one shown in Fig. 2. The operation is drilling an attaching hole in the type.

As the drill is lowered to the work, a cam turns on compressed air to actuate the small piston of the work fixture shown in the picture. This clamps the type in place for drilling. As the drill is raised, air pressure, set at about 40 psi, is turned off by the cam and the type removed. There is a considerable advantage from the extra speed obtained in this automatic positioning, but the most important reason for using the steady, regulated pressure of air is the accuracy obtained, the company states.

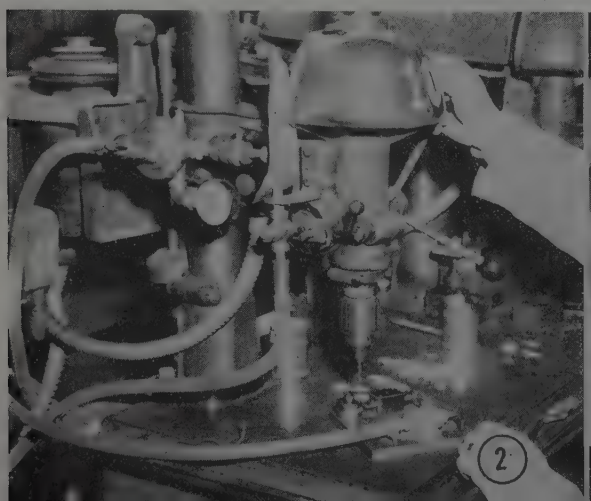
Drilled type must line up exactly in the compact shorthand machine. Different drill operators, or even the same one will not always hold the pieve at the

(*Please turn to Page* 144)

Fig. 1—Press converted to compressed air operation for forming plastic covers for shorthand machine's mechanism. Lever below operator's hand controls both press piston and air introduced in side of die to hold cover for accurate forming

Fig. 2—Drilling of attaching holes in type is done with aid of device on the table, air piston of which clamps type with uniform pressure

Fig. 3—Built into the fixture, a small air motor turns the rubber platens in the grinding process. Speed is controlled by bar at operator's finger-tips. Vacuum at right draws off ground rubber



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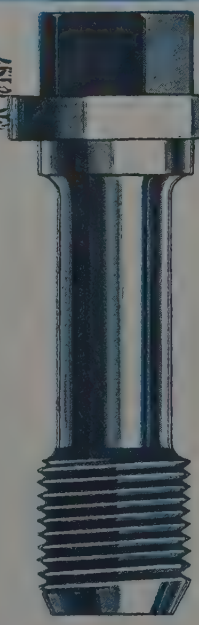

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Preparing Steel

(*Continued from Page* 103)

It is this latter form which causes most of the enameling difficulties, due to the formation of volatile gases during the firing cycles. Thus, when mild steel generally known as 10-20 is substituted for enameling iron the tendencies are for an increase in defects in the enamel surface because of these gases. Other difficulties are usually encountered because of the greater tendency for mild steel to warp, sag and to be subject to laminations from gas pockets retained from the ingot during rolling.

It is customary in rolling enameling stock to crop the ingots more carefully than is usually done for mild steels. In rimmed ingots of higher carbon content, such as the mild steel, the primary blow holes are more numerous, larger in size and nearer to the surface which often causes the laminations that cannot be seen until after the formed part is heated to the point of fusion of the enamel.

It is essential for enameling that all grease, soil, rust and welding scale be removed from the steel surface, usually by an alkaline cleaning solution and hot sulphuric acid. There are many good commercial alkaline cleaners giving best results when maintained at boiling temperature and at concentrations of approximately 6 to 8 oz per gallon of solution. After having been cleaned and thoroughly rinsed, the parts to be enameled are immersed in sulphuric acid solution maintained at approximately 6 per cent sulphuric acid by weight and at a temperature of 160° F. Time of immersion is usually 10 to 15 min or until all scale and rust are removed. There should be some etching of the surface. Inhibitors are generally not used in connection with pickling of steel for enameling. The ware may or may not be rinsed after the acid etch.

Nickel Flash: It is with the next step in the treatment of the steel that this article is most concerned. Importance of a good nickel flash in lowering rejects and insuring generally good en-

DATA TABLE

Year	1934	1935	1937	1937	1938	1938	1944	1945	
Reference	2f	Hansen & Irwin 2b	Hansen 2d	Petty-john 1	Kautz 2c	Zander 2e	Joint Com. of Frit & P. E. Sheet Mfgs. 2a	Anon. g	Present Ferro Lab.
Nickel Salt	Double	Single	Single	Single	Single	Single	Single	Single	Single
Conc. oz./gal.	4.25	White G.C. 8.0 Blue 4 - 5	2	3.5 - 4.0	2 - 4	3	½ - 3	1	1¼
pH	5.9 5.2 - 6.5	5.6 - 6.2	.....	5.4 - 6.2	5.2 - 6.0	6.0 - 6.2	5.4 - 6.2	3.5	3.5
Temp. °F.	180 - 190	160 - 180	160 - 180	120 - 130	170 - 190	150 - 160	150 - 160	160	160
Time-Min.	3 - 5	"Variable"	5	3	4 - 5	5	4 - 6	10	White G.C. 10' Blue G.C. 4'
Buffer	Boric Ac.	Boric Ac.	Boric Ac.	Boric Ac.	Boric Ac.	Boric Ac.	.....	None	None
Buffer Conc. oz./gal.	0.25	.....	0.25	0.2	0.25	0.25	.....	.....	.....
Adjust pH with	Ammon. Carb.	.....	.....	Aqua Ammon.	.....	.....	.....	Sulphuric Acid or Sod. Hydroxide	H_2SO_4 or NAOH
Rinse	Water Essential	"Conventional"	Cold Water	.....	.....	Cold Water	Cold Running Water	Omit or use H_2SO_4 pH 3.0	None
Neutralizer	"As Usual"	"Conventional"	.....	.....	.....	.....	.....	.....	NaCN
Remarks:		Calls attention to difficulties in G.C. application associated with too high concentration of nickel salts. Too heavy nickel deposit causes G.C. blisters when scratched.		Cost $0.022/100 square feet at 13½c lb. Nickel salt and aqua ammonia at 6c/lb.		Advocates cold water rinse before and after nickel flash. "All ware must be rinsed after pickling before immersing in the nickel bath."	Hot rinse recommended before nickel treatment and quick rinse in cold water after.	Avoid use of boric acid and ammonium carbonate for adjustment of pH.	Avoid carbonates in nickel tank. Rinse between acid and nickel flash is kept at pH 3 - 3.5.

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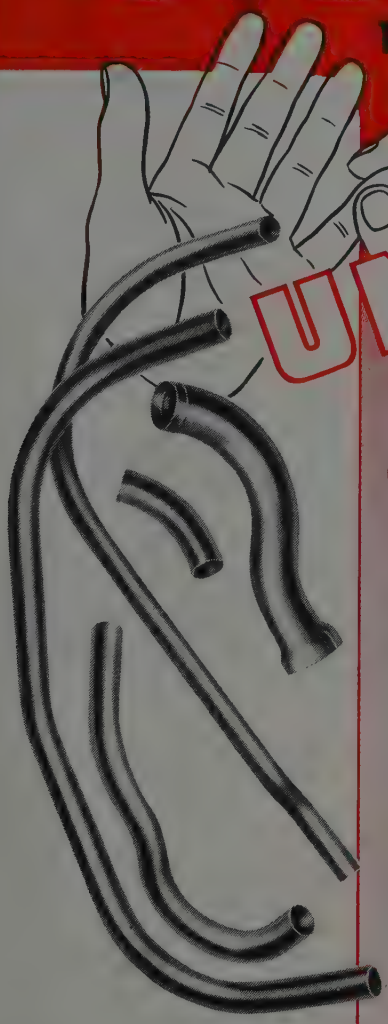

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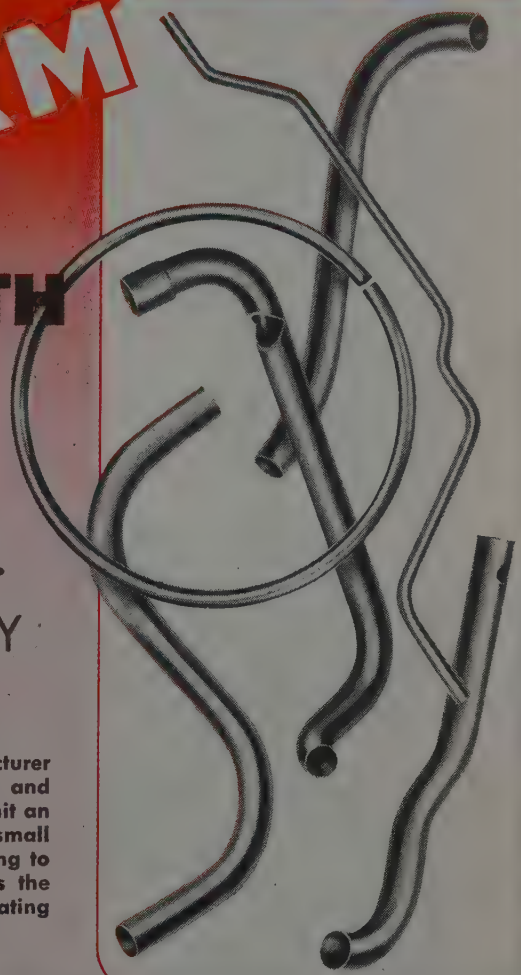

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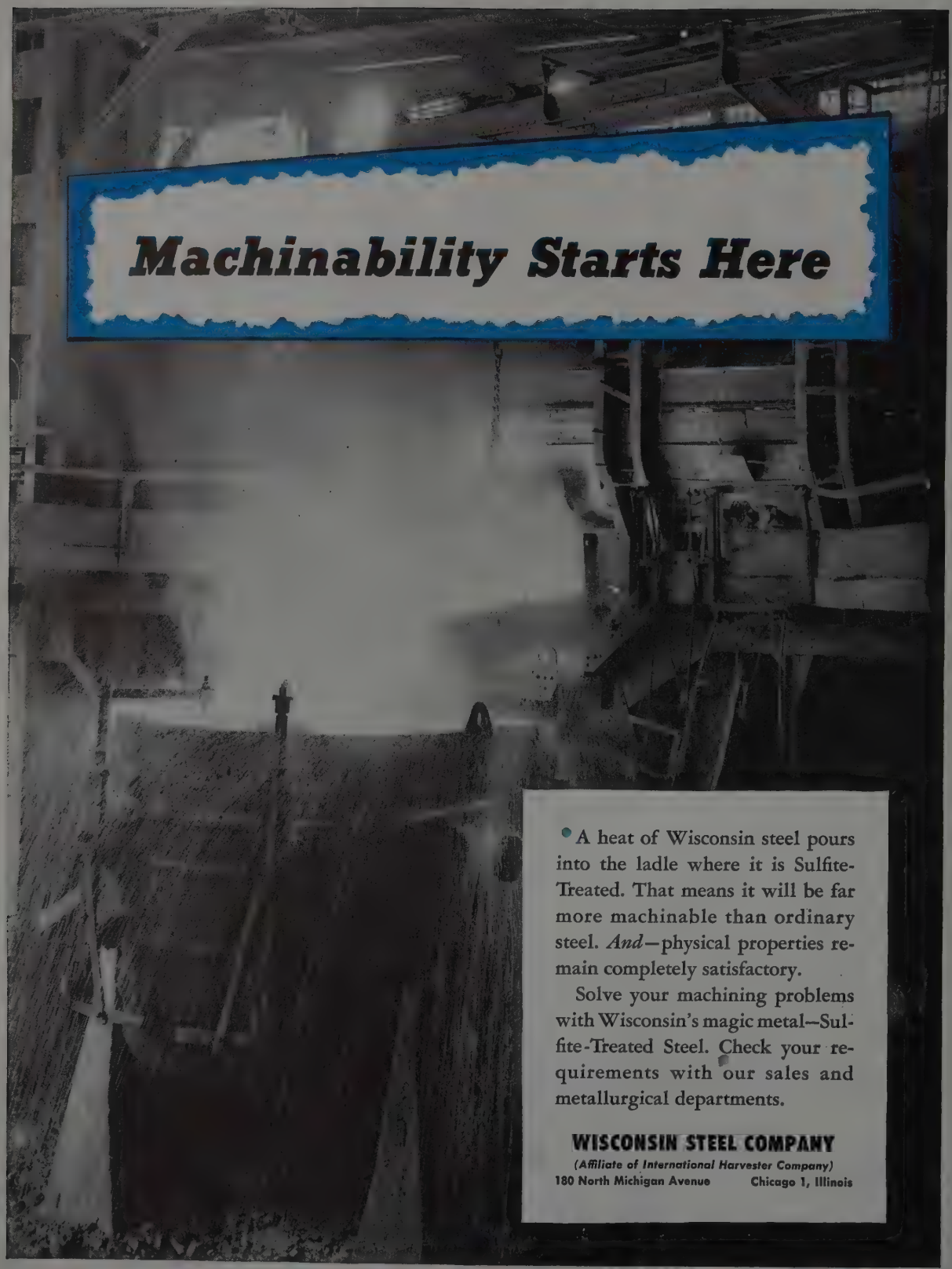
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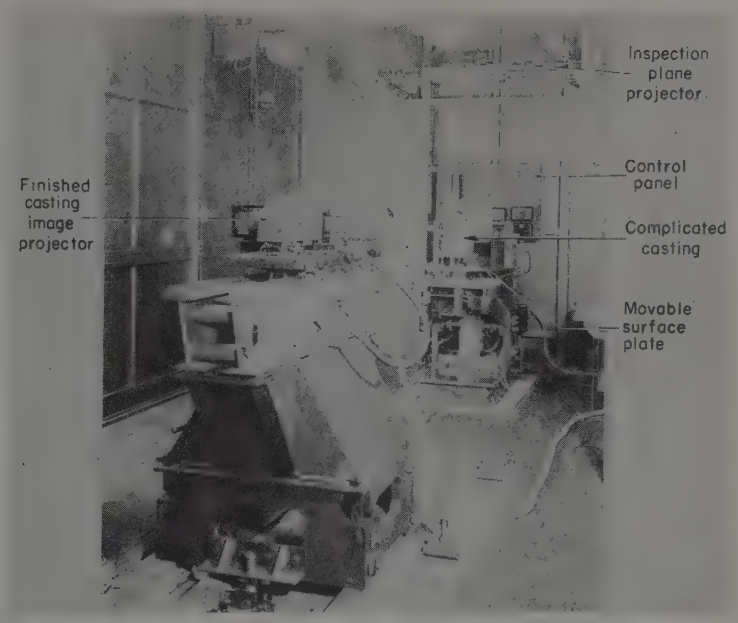
WISCONSIN SULFITE-TREATED STEEL

ameling qualities of all types of steel cannot be overstressed. (This does not apply to the newer steels with surfaces plated at the mill). A good nickel deposit of from 0.04 to 0.08 g of nickel per square foot of metal surface improves the bonding range of the ground coat to the steel, minimizes copper beading and fishscaling by reducing overactive oxidation characteristics of the steel. The enamel is bonded to the steel through absorption of a uniform adhering oxide layer into the enamel layer. The nickel flash regulates the quality of this oxide layer.

In a paper[2] presented before the second annual forum of the Porcelain Enamel Institute in October, 1937, James Pettyjohn listed the advantages and disadvantages of the nickel treatment. The advantages mentioned were: Reduced copper-heading, better bond of the ground coat to the steel base, more uniform steel surface texture, prevention of fishscaling, more uniform ground coat color and prevention of rusting of ware in storage. For the disadvantages, it was said that good repickled ware was difficult to obtain, the cost was appreciable ($0.022 per 100 sq ft of ware treated with single nickel salts at $0.135 per pound and aqua ammonia at $0.06 per pound), and the very close control of a nickel dip tank which is required. The discussion period that followed the presentation of this paper brought out clearly the importance of sludge removal and general rinsing problems associated with nickel treatment.

Numerous[2] articles on nickel dip, its control and application to porcelain enameling have appeared in the literature over the past 15 years. Since many of these give accurate and specific instructions for the control of acidity, and nickel content, it is not within the scope of this paper to dwell on the methods used but rather to stress the importance of such control, the permissible ranges of the pertinent variables in operation and the general effects of nickel treatment in relation to blue ground coat and particularly for application of white direct to steel.

Wainer and Baldwin[3] have discussed nickel deposition entirely from the viewpoint of the nature of the nickel deposit and its relation to porcelain enamel adherence. These authors say that "small amounts of corrosive agents, probably sulphates, will oxidize the nickel. Adequate rinsing between nickel flash and neutralizer is thus indicated as a requirement. . . The zircon enamels developed adherence at a nickel content of 0.025 to about 0.10 g per square foot, the optimum approximately 0.05 g per square foot . . . To insure adherence for the zircon enamels, close control of the nickel flash is required. *With any enamel, adherence can be destroyed by the deposition of too much nickel.*"



THREE-DIMENSIONAL INSPECTION: Inspection and layout by a three-dimensional method of projecting accurate drawings upon ferrous and non-ferrous rough castings have been successfully applied for several years using apparatus shown here. Developed by engineers of the General Electric Pittsfield, Mass., works, the equipment consists of a layout image projector containing a photographic glass slide of the finished casting layout which is projected directly upon the casting surface. To establish the plane of true projection and correct dimensions, a second projector—the inspection plane—is set over the inspection position, emitting a sheet of light which falls vertically upon the casting. Assuring a layout within 0.015-in., the template projection system may be used in fabricating duplicate metal parts for tanks, boilers and other burned-out and welded pieces

Hansen and Irwin[2b] have stated that solutions too high in nickel salt content caused difficulties in dipping and draining enamels, as well as streaked enamel and occasional blistering. They also said that ware heavily "nickeled," if scratched before coating with porcelain enamel, often shows a row of blisters over the scratch after firing. These authors concluded that "Nickel dips, properly used, promote adherence of porcelain enamels to sheet iron or steel, minimize or at least decrease fishscaling and control or decrease copperheading."

Variables To Be Controlled: For good porcelain enameling practice, it should be the aim of every shop operator constantly to control all operations throughout the shop. For successful nickel application, control is a must. It can be truly said that all difficulties encountered in utilizing a nickel flash and any doubt as to the efficacies gained are because of a lack of appreciation of the importance of uniform conditions of the solution and treatment at all times.

Most authors, researchers and shop operators agree that temperature of the bath, concentration of nickel salts, and degree of acidity or pH of the solution are of prime importance and must be controlled within rather narrow limits. In addition, such factors as time of immersion, sequence, and methods of rinsing before and after the nickel flash, interval of exposure to air between each step in the process, thickness of nickel coating, type of steel surface being treated and proper removal of sludge, have important bearings on the quality of the resultant coating.

A resume of published practices is given in the data table. These practices vary in detail but most writers agree that with single nickel salts, a concentration of from 1/2 to 3 oz per gallon of solution, a pH of 5.4 to 6.2, a temperature of 150 to 180° F and a time cycle of 4 to 6 min should be maintained, at least for blue ground coat application.

The important point is—and this cannot be stressed too greatly—when a set of conditions for the nickel flash sequences are once determined for satisfactory performance in any given shop under normal operation, those conditions should always be maintained to a point within a

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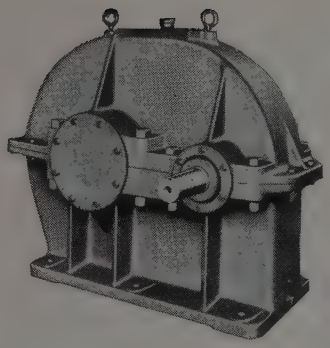

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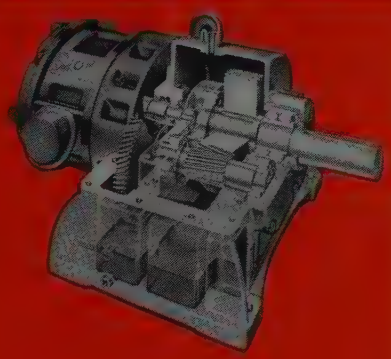

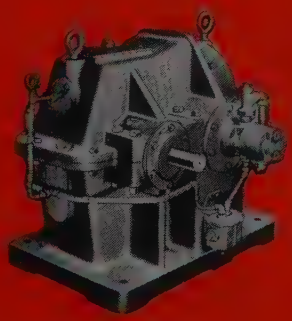

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practical narrow limit of variation.

Thus, if it is found that a temperature of 150 to 160° F for the solution gives the best deposit, the temperature always should be within this range. Never permit the temperature to rise to 190° F or fall to 130° F for example, even though some other shop may employ a higher or lower temperature. The same principle applies to variation in acidity, concentration and time of treatment, as all have an important bearing on both the nature and amount of deposit.

A heretofore little stressed but, according to the researches of the Ferro laboratory, important variable is the kind and amount of iron salts deposited on the ware during the nickel flash and their degree of oxidation upon exposure to air. It is these salts which have a great bearing on the quality of white applied directly to the iron and undoubtedly have considerable influence on the quality of blue ground coat over a nickel flashed surface.

Brown and black specking which often appears in clusters of small spots and sometimes as larger spots resembling metallic copper when white porcelain enamels are applied to the metal have been found to be produced by a deposit of iron salts which covered the sheet after completing its sequences of preparation, including nickel flash, for porcelain enameling. The effects of salts on direct application of white porcelain enamel can easily be demonstrated upon removing the deposit from one-half of a treated sheet by wiping free of salts with a clean cloth, and finishing the entire surface. In every case this has been tried, the specking has been effectively eliminated over that part of the surface rubbed free of the salt deposit.

There is much evidence that the nickel treatment contributes in some manner to the iron salt deposition but is not the sole factor. Variables of treatment including temperature of acid bath, nickel and neutralizer solutions; effect of scrubbing the surface under water; pickling and nickel flash time as well as pH of the nickel solution have been studied in relation to the effect on this iron salt deposit.

Data indicate that the nickel dip operation contributes markedly to salt deposition. However, the other steps in the preparation of the metal surface for porcelain enameling are not excluded as contributing factors.

Sometimes white applied directly to steel will show black specking as well as brown spotting or often the specks will be almost entirely black. It is believed that black specking of white applied directly to special steels and amount of salts on the metal surface are directly related. This is evidenced by the fact that removal of the salt deposit by wiping eliminates black specking as well as the typical brown spotting.

Immersing samples for 5 to 10 min in a 1 per cent sulphuric acid solution (pH 1.3) after the nickel dip and before neutralizing, effectively and completely prevented the formation of insoluble, or nonrinsing rusty salts deposit and the sheets could be coated with white porcelain enamel applied to the iron with no black or brown specking. Later experiments showed that with the practices recommended in this paper a rinse of pH 3.0 (about 0.002 per cent sulphuric acid) is effective. This slight acidity prevents the hydrolysis of the iron salts to insoluble form.

Analysis of samples of salt deposit removed from steel sheets showed the presence of both iron and nickel, with only a trace of sulphate. Thus, it was inferred that the salt deposit is a mixture of iron and nickel hydroxide, iron being in the ferric state.

The fact that black and brown specking can be reduced to a minimum by (1) scrubbing the surface of the sheets following the nickel treatment, (2) wiping off the salt deposits or (3) by dissolving off in a weak acid bath indicates that the cause of black specking is a surface effect and is related to the accumulation of iron salts which occurs for the most part after the nickel flash.

Experimental work with sodium cyanide neutralizer solutions at various temperatures proved that the type of iron salts causing trouble cannot be dissolved by sodium cyanide. This suggested that cyanide is only effective in eliminating ferrous salts and that if all salts could be reduced to the ferrous state a cyanide neutralizer should be effective in their complete removal.

Experimental work demonstrated that ammonium oxalate, citric acid, ammonium citrate and tannic acid were effective in removing the iron salt deposit from the steel. It is to be noted that all these materials are reducing agents and that of the ferric salts, only ferric oxalate is soluble in sodium cyanide. Further experimentation with an ammonium oxalate rinse after the nickel flash and a subsequent immersion in sodium cyanide neutralizer showed conclusively that when steel was placed immediately in the neutralizer after removal from the oxalate rinse no residual salts were in evidence, but if allowed even partially to dry between these steps, salt deposits remained on the sheet.

It is obvious from the discussion that

LIFT TRUCK OR CRANE: Equipped with an A-frame boom, this 9-ton hydraulic gasoline-powered lift truck manufactured by Ross Carrier Co., Benton Harbor, Mich., is shown above handling steel at Evans Products Co.'s Detroit plant. A-frame attachment is readily mounted directly on the forks and can be removed easily. With the crane attachment a good deal of flexibility is obtained; the truck can operate either as a conventional fork lift truck or as a crane. Adjustable or offset forks, as well as slope-piling, scoops, rams and other special attachments may be used to give the material mover further flexibility

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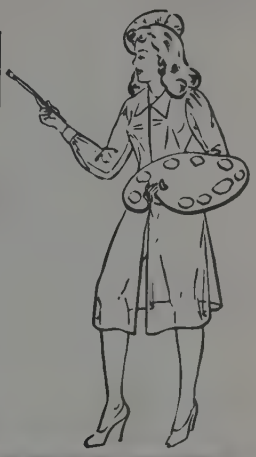

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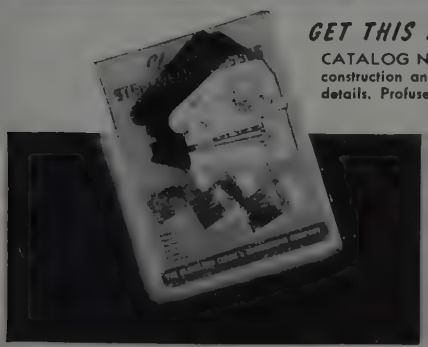

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much of the difficulty encountered with a nickel flash step in the pickle room results from oxidized iron salts that form on the surface of the steel and that the severity of the difficulties are directly related to the degree of their oxidation. It has been shown that amount and types of these salts are not only influenced by time, temperature and concentration of the baths but that the time intervals beween immersion in the various solutions are of extreme importance. The ideal system would be one that required no time interval whatsoever between baths or in which the ware would be exposed only to a neutral atmosphere. Since neither condition is practical, some compromise must be made.

It has been shown that weak sulphuric acid is effective in removing the salts and that some salts are formed between the acid and nickel operations when a neutral water rinse after acid is used. Therefore it would seem reasonable that a weak acid rinse would be in order since this prevents the formation of ferric salts (hydroxide).

Since ammonium oxalate is expensive, it is undesirable for plant use. A weak acid rinse is effective but it has been found more effective in eliminating iron salts *to omit the rinse entirely and transfer the ware directly from a nickel flash tank to a cyanide neutralizer with a minimum of exposure to air in the process.*

This appears contrary to former accepted practices, but in the past these employed double nickel salts, boric acid as a buffer, and a pH mostly near 6.2. All three conditions act to promote excessive formation of iron salts and hence the use of a rinse was found to be desirable.

Results of the experiments referred to in this article and the general experience of laboratory daily procedures indicate that an acid rinse of at least pH 3.0 should be used instead of hot water; but for best results, single nickel salts, no boric acid buffer and pH 3.5 should be maintained in the nickel flash tank. Under these conditions formation of iron salts is kept to a minimum and under most conditions no rinse is required between the nickel flash and the neutralizer.

Pettyjohn[1] and Hansen[2b] have stressed the importance of and methods for removal of sludge from the nickel tank. Pumping solution continuously through a small, nonferrous filter press is an excellent method for maintaining clear solutions.

However, by maintaining the nickel solution at pH 3.5 the tendency to form this sludge is greatly minimized. Most of the sludge comes from the oxidation of the iron in the soluble salts to the ferric state, which then hydrolyze to the insoluble ferric hydroxide when the pH is kept in the range of 5.4 to 6.2.

An acid rinse of pH 3.0 may be necessary to prevent excessive sludge when omitting the rinse between the nickel flash and the neutralizer. In any case, two neutralizer tanks will assure completely neutralized ware. The first tank should be changed frequently. The improved results usually justify the expense of increased consumption of neutralizer.

Another method for improving the neutralizer, especially when the nickel rinse is omitted, is to install a continuous filter system for the first neutralizer tank. An iron filter system is satisfactory in this case.

Recommended Sequence for Nickel Flash: Large scale production procedures as well as research have shown the following conditions and sequence of operation to give effectively nickeled steel without the dangers of iron salts:

1. After the acid pickle—5 min rinse in sulphuric acid of pH at room temperature.
2. Nickel Dip—Solution should contain 3/4 to 1 1/2 oz preferably 1 oz, single nickel salts per gallon. Maintain acidity at pH 3.5 with addition of sulphuric acid or sodium hydroxide. Do not use boric acid as a buffer as this promotes excessive formation of complex iron salts. Ammonia and ammonium carbonate additions should be avoided for the same reasons. Temperature of the bath should be 155 to 160° F. Under these conditions the ware should be left in the bath a sufficient length of time to deposit 0.04 to 0.08 g of metallic nickel per square foot of metal surface. The lower range is satisfactory for the average blue ground coat while the heavier deposits usually are best for white enamel directly on the steel.
3. Do not use a rinse. If it is felt absolutely necessary, a short rinse in sulphuric acid of pH 3.0 is effective. The time interval between the nickel flash and the rinse, as well as between the rinse and the neutralizer should be extremely short.
4. Two neutralizer tanks should be available, the first made up in fairly strong solutions and the second weaker. Suggested conditions are:
   a. 0.4 oz/gal sodium cyanide
      0.2 oz/gal sodium hydroxide
      Temperature 140° F, time 1 1/2-min immersion.
   b. 0.12 oz/gal sodium cyanide
      0.10 oz/gal sodium hydroxide
      Temperature 140° F, time 2 1/2-min immersion.

Carbonates should be avoided in the neutralizer since these have been found to hinder cyanide removal of ferrous salts.

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OTS Report Covers Causes Of Steel Brittleness

Widely accepted explanations of the nature and causes of temper brittleness in steel may be incorrect, as no conclusions are yet justified as to the effect of steel making practices on the extent or rate of brittleness transformation, states a wartime research report prepared by the Army Ordnance Department and now on sale by Office of Technical Services, Department of Commerce, Washington.

Main subjects covered are: Effect of the temper brittleness transformation on tensile, impact and other physical properties and on metallurgical structures; effect of variables, including time and temperature of transformation, structure, composition, and forming, casting and refining practices; nature, effect of precipitation in temper brittleness.

This report, PB-55762, includes charts, graphs, photographs, photomicrographs and a bibliography. Companion report, PB-55763, contains records of impact tests performed on several steels of varying susceptibility to temper brittleness.

Diamond Core Drill Fittings Standard Accepted

Signed acceptances from a number of manufacturers, distributors and users, estimated to represent a satisfactory majority, have enabled the National Bureau of Standards, Department of Commerce, Washington, to report acceptance of the recommended revision of diamond core drill fittings as a voluntary standard, effective July 1, 1947. The commercial standard will be identified as CS-17-47.

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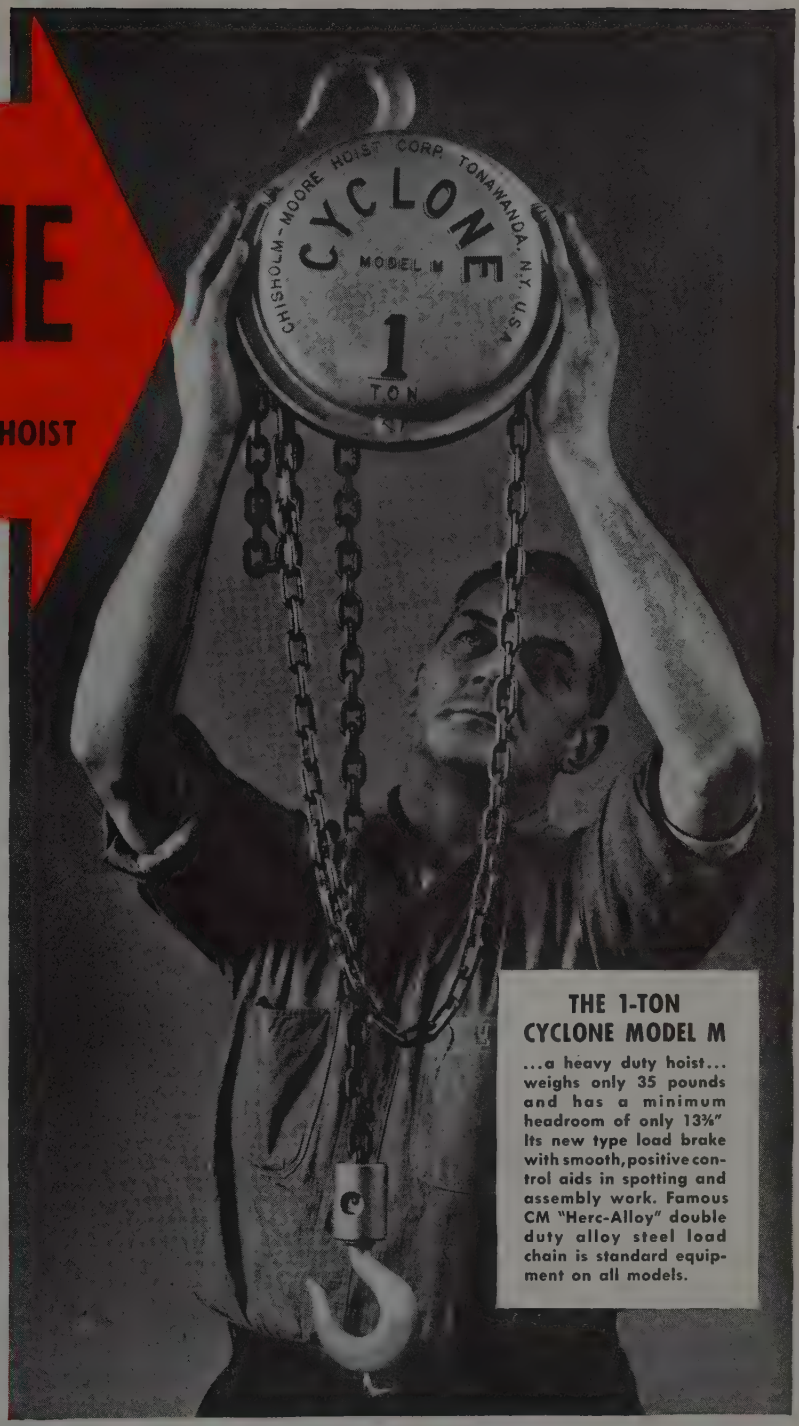

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Power Distribution Added To "More Power" Program

Load-center power distribution, aimed at the modernization of present power distribution systems as well as the practical and efficient engineering of new installations, has been added to the subjects in the "More Power to America" program of General Electric Co., Schenectady, N. Y. It is a long range program for power sales engineers designed to promote more efficient utilization of present available electric power through the use of load-center power distribution.

A further purpose is to inspire the use of added power by showing how this method of distribution can simplify the problem of meeting future power needs, the company states. It goes on to encourage the placing of power where it is needed and stimulates greater safety, flexibility and dependability, as well as low cost installation and maintenance.

Two distinct features, it is reported, set load-center distribution apart from conventional methods of power delivery. First, power is recevied and distributed at high voltage to unit substations located close to the centers of electrical load, here being stepped down to utilization voltage. Second, where total plant load cannot be met by a single small substation of 1000 kva or less, two or more load-center substations are used rather than a single substation at the point of incoming supply.

Included in the program are a 64-page manual "Load-Center Power Distribution", a booklet, "What Load-Center Power Distribution Can Do For You" and a 30-min sound slidefilm in color entitled "Modern Industrial Power Distribution."

American, European Magnesium Alloys Compared

American commercial magnesium casting alloys can tolerate microporosity with less loss of mechanical strength than comparable European alloys but are more susceptible to porosity under the same casting conditions. This fact is brought out in a wartime research report available from Office of Technical Services, Department of Commerce, Washington.

The basic difference between the two commonly favored American and the two European alloys is that the foreign alloys contain slightly more aluminum and less zinc than the American. Tests of ultimate, strength, yield strength and elongation of bars having the same index of porosity gave uniformly better results for the American alloys.

LETTERS *to the Editors...*

Nine-Year Scoop

While in the process of cleaning out some of the old files which had accumulated over a period of years I came across an article supplied to you on "Three Dimensional Models" for laying out jobs. With all the writing on this subject in the last year, it looks like we had scooped the news about nine years ahead of most of them.

You might note that at the time we suggested that equipment manufacturers should make available to their customers "three dimensional scale models". Equipment firms have failed to do this; however, there is a company now furnishing models.

C. H. Beare
Manufacturing Engineer
Inland Mfg. Division
General Motors Corp.
Dayton 1, Ohio

No Friday the Thirteenths

A friend of mine sent me a clipping from STEEL, June 17, 1946, page 86, regarding the so-called "World Calendar". I trust you will be so kind as to study the plan I have proposed since 1919. For your information, the "Perpetual Calendar" has not become so widely known as the "World Calendar", even though I developed it 10 years before the other was formulated. It has been a hobby with me and I seek no personal profit nor publicity from its adoption. My plan was introduced to Congress in September, 1943 as evidenced by the enclosed Congressional Record sheet.

My plan not only makes for smoother payroll calculations, more accurate cost accounting and for more informative production comparisons, but does them better than the "World Calendar". For instance, the 1st and 15th, common payroll and accounting days, are always on week days, this not being so in the other plan. I suggest that New Year's Day be a day apart, followed by Monday, January 1, the first working day and the second day of the year. This holiday always follows Saturday and Sunday and making it the third day of a three day week end. In leap years, a Leap Year Day would be observed between June 31 and July 1 as a second day apart. The week would begin on Monday and end with Sunday.

The "Perpetual Calendar" is freely offered and my only interest is to see the best calendar adopted. Will you help in any way you can to introduce it to the steel industry.

Willard E. Edwards, Lt. Comdr. USNR
USS Antietam (CV-36)
c/o Fleet P.O.
San Francisco, Calif.

Vacuum Furnace Pioneer

Your article in the April 14 issue of STEEL covers a very timely subject, and I read it with a great deal of interest, as my activity in this field antedates that of any mentioned in your article. You might be interested to know that I built and operated a vacuum furnace of the Arsem type at University of Illinois from 1912 to 1916. During this time I demonstrated that magnetic properties of iron and iron-silicon alloys could be greatly improved by vacuum melting, because by this process the carbon and oxygen could be eliminated simultaneously through the reaction

$$FeO + C \rightleftarrows Fe + CO,$$

the CO being removed continuously, so that very low values of carbon and oxygen could be obtained. Results were published in bulletins of University of Illinois Engineering Experiment Station in 1914 and 1915 and in Trans. of AIEE and AIME in 1915 and 1916.

The work was continued at the Westinghouse Research labs from 1916 on and results of this work laid the foundation for the Hipersil alloy used in our transformers since 1940. We are now applying vacuum melting to some new magnetic alloys that look very promising and in this case it looks as if the vacuum process may actually be applied commercially.

T. D. Yensen, Manager
Magnetic Department
Westinghouse Electric Corp.
East Pittsburgh, Pa.

That Galvanizing Book

In a November issue of your publication you had an article dealing with galvanizing and stated that other articles would follow. Unfortunately, our file of magazines is incomplete as some of our employees have consulted them and failed to return them. This prompts us to ask if there have been any other articles on this subject since the original.

F. A. Duerr, General Manager
Troop Water Heater Co.
2516-2526 Jane Street
Pittsburgh 3, Pa.

You no doubt refer to the 14-part series entitled "Hot-Dip Galvanizing Practice", by Wm. H. Spowers Jr. This series ended in December and will be available in book form within several months, our book department reports.—ED.

Furnace Brazing

(*Continued from Page* 106)

shown that dry hydrogen and dissociated ammonia are the two that are most conducive to the production of high-strength joints. When these atmospheres are of sufficient purity, fluxes can be dispensed with entirely and one cause of low-strength joints eliminated.

Dissociated ammonia is usually preferable to hydrogen for use as furnace atmosphere because it is easily controlled, is very dry and pure, having dewpoints on the order of minus 60 to minus 70° C, and presents a lesser explosion hazard. It is a mixture of 75 per cent hydrogen, 25 per cent nitrogen and is prepared by thermal dissociation of pure anhydrous liquid ammonia. The ammonia is purchased in steel cylinders containing 50, 100 or 150 lb of liquid. It is a most convenient source of the gas because it requires no further purification and is widely available.

When a metal is heated in a protective furnace atmosphere of hydrogen and nitrogen, the temperature to which the metal is heated, the oxygen concentration of the gas, and the metal itself will determine whether an oxide film will form on the metal surface. These oxide films prevent the necessary wetting of the joint surfaces to the molten brazing alloy and the subsequent inter-alloying and diffusion so necessary for the producion of strong, sound joints.

Metals differ very greatly as to the dissociation pressures of their oxides. For example, silver oxide will dissociate at relatively low temperatures as compared with chromium oxide. Iron oxide will dissociate at a temperature between that of silver oxide and chromium oxide. This is, of course, assuming a constant oxygen concentration in the surrounding atmosphere. Because of these differences in dissociation pressures, oxide films of chromium are more difficult to reduce than those of iron, and furnace atmospheres of lower oxygen concentration are required for their reduction.

TABLE IV
BEND STRENGTH OF COPPER-BRAZED OXIDIZED JOINTS

Specimen	Load Required for Fracture in Bending, Lb		
	Unoxidized	Thin Oxide Film	Heavy Oxide Film
U	25,600	16,500	11,200
F	23,600	18,600	12,900
R	27,000	17,000	12,100
Ave.	25,400	17,400	12,000

TABLE V
TENSILE STRENGTH OF COPPER ALLOY BRAZED OXIDIZED JOINTS

No. of Specimen	Temp. of Test F	Type of Surface	Ultimate Tensile St. Test, PSI
1F2	Room Temp.	Unoxidized	116,000
N4	Room Temp.	Oxidized	87,000
1F3	932 F	Unoxidized	53,700
N3	932 F	Oxidized	37,800

TABLE VI
EFFECT OF SPACING ON STRENGTH OF BRAZED JOINTS

Brazing Alloy	Spacing Inches	Ultimate Tensile Strength, PSI Room Temperature	932 F
"Cupaloy"	0.0005	129,400	47,500
	0.0010	110,300	.....
	0.0020	98,000	39,200
"Cuferco"	0.0005	126,400	.....
	0.0040	108,000	.....
Cu-Ni-Si	0.0005	125,500	.....
	0.0025	109,500	.....
	0.0036	93,000	.....
Cu-Fe-Mn	0.0005	125,750	59,000
	0.0030	115,000	50,000
"Cupaloy" (Pre-Filled Joints)	0.0005	124,000	.....
	0.0020	110,500	.....
	0.0040	71,800	.....
	0.0060	84,000	.....
	0.0080	56,000	.....

TABLE VII
TENSILE STRENGTHS OF BRAZED JOINTS AS EFFECTED BY COMPOSITION OF BRAZING ALLOYS, ROOM TEMP.

Type of Alloy	Composition Bal. Cu	Ult. Ten. St., PSI Room Temp.	932 F
Oxygen Free Copper	100% Cu	124,000	45,000
"Cupaloy" (Cu-Cr)*	0.47% Cr	121,000	49,000
"Cuferco" (Cu-Co-Fe)*	2% Fe, 2% Co	126,000	57,000
Cu-Ni-Si*	2½% Si, 8% Ni	125,000	63,000
Cu-Fe-Mn*	1% Fe, 1% Mn	126,000	59,000

The chemical reaction between a metal and oxygen when heated in an atmosphere of limited oxygen concentration is a reversible one as indicated by the equations (2):

$$4\ Cr + 3\ O_2 \rightleftarrows 2\ Cr_2O_3$$

$$4\ Fe + 3\ O_2 \rightleftarrows 2\ Fe_2O_3$$

These reactions can be brought into equilibrium or be forced to react in either direction by manipulation of temperature or by variation in water vapor (i. e., oxygen) concentration. For example, it is possible for chromium-steel to become oxidized at low temperatures and to be reduced at higher temperatures in an unchanged furnace atmosphere possessing a dew-point of say, minus 35° C.

The maintenance of an actively reducing atmosphere in a brazing furnace dealing with high chromium-steel is a matter of some difficulty. In practice it is found that the dewpoint of a dissociated ammonia atmosphere, for example, should be below —40°C to prevent oxidation of 12 per cent chromium steel at temperature suitable for copper brazing, approximately 1100° C. Maintenance of these low dewpoints requires careful furnace operation and well designed furnaces.

The presence of oxide films on the metals while the brazing metal is molten will greatly reduce the strength of the brazed joints. Results of bend tests on oxidized and unoxidized chromium-steel specimens, given in Table IV and tensile tests in Table V, clearly reveal the weakness resulting from attempts to braze oxidized surfaces. These specimens were selectively oxidized by heating one end to 1000°C in air for ½-hour in a preliminary oxidizing heat-treatment.

The failure of brazed joints made with oxidized surfaces occurs through the oxide film due to the inherently low strength of metallic oxides. A microsection through a brazed oxidized joint is shown in Fig. 3. Wetting of the oxidized specimens by the brazing alloy resulted from the reduction of a thin surface layer of oxide during the brazing treatment.

Tensile tests on brazed joints initially prepared with lapped, fine ground, rough ground, and sandblasted surfaces disclosed two facts:

1. The degree of smoothness of the surfaces had no significant effect on the strength of brazed joints as long as the effective spacings of the joints did not become excessive, (greater than 0.002-in.). The results of tensile tests revealed that surfaces prepared by lapping and fine and rough grinding and subsequently brazed yielded joints of substantially equal strength both at room temperature and at elevated temperatures.

2. Joints between sandblasted surfaces had approximately half the strength of those between fine ground surfaces, for example. This decrease in strength is caused by the formation of oxidized areas surrounding grains of sand which had inbedded themselves in the surface during sandblasting.

Effect of Joint Spacing: A survey of the slight amount of formation available on strength of brazed joints offered somewhat confusing testimony on the spacing at which maximum joint strength would be obtained. Some of the data were contradictory in that with similar brazing alloys, brazing procedures, and metals brazed, one set of data indicated that maximum strength was obtained at a spacing of 0.0045-in. whereas a second set revealed that maximum strength was

obtained at the minimum possible spacing.

To clear away some of the confusion surrounding the effect of spacing, a series of tensile tests were made on brazed chrome-steel specimens having joint spacings of from 0.0005 to 0.008-in. The results are given in Table VII, found on page 124.

The data indicate that the closer the spacing, the greater the joint strength, and in every case, the closest spaced joint possessed the highest strength. This has been explained by the closer approach to shear type of failure in the wider spacings and by the increased amount of alloying occurring in the very close spacing.

Close joint spacings were found to be disturbed by warpage if the metals being brazed contained residual stresses remaining from previous heat-treatments and cold workings. Incomplete annealing after rolling and forging operations and cold-working resulting from machining operations are the two principal sources of these residual stresses. Residual stresses were eliminated by stress-relieving treatments given the specimens after the heavy machining has been completed and preliminary to the brazing operation.

Feeding Brazing Alloys: Two procedures for supplying brazing alloys to the desired location within a joint were studied. In the first procedure, for convenience called prefilling, the brazing alloy in the form of 0.10-in. thick foil was placed within the joint before brazing, (A), Fig. 7. The second procedure, called capillary feeding, consisted of placing the brazing alloy in the form of rods outside the joint but where it had access to the joint when molten, (B), Fig. 7. The molten alloy spread throughout the joint by capillary action.

Room temperature tests indicated that there was little to be gained in joint strength at ordinary temperatures by resorting to capillary feeding. On the other hand, capillary fed joints were markedly stronger than prefilled joints when tested at 932°F (500° C). An increase in strength was obtained, from 37,000 psi to 49,500 psi, which amounted to a 34 per cent increase.

The increase in strength was attributed to an improvement in brazing action which may be explained as follows: With a prefilled joint, the brazing alloy melts initially at the outside edges due to the temperature gradient and tends to seal whatever gases or solid foreign materials are contained within the joints.

In joints that are fed by capillarity from the thermal center of the mass all portions of the mass reach brazing temperature before the brazing alloy become molten. The flow of molten metal is, therefore, radially outward from the feed point and the tendency is for the molten alloy to carry ahead of it any gases, impurities or inclusions that may be present.

Tensile tests were performed on chromium-steel specimens brazed with a variety of copper alloys and with the preferred methods of preparation described in the preceding sections. The data, Table VII, indicates that although very high joint strengths can be obtained at room temperature with these alloys, their strengths were not appreciably higher than joints brazed with copper. However, high room temperature strengths with copper can be obtained only with copper that is purer than ordinary commercial copper as the high joint strengths here reported were obtained with oxygen-free copper.

Study of the data revealed two significant facts. First, that alloying copper with up to 10 per cent of other alloying elements where no appreciable increase in melting temperature occurred resulted in negligible increase in the room temperature strength of the joints brazed. Thus where brazed parts are not subjected to unusual temperature conditions no advantage is gained by substituting more expensive copper alloys for oxygen-free copper.

Secondly, when tested at 932° F (500° C), similar joints brazed with alloyed copper possessed a strength 40 per cent greater than was obtained with oxygen-free copper. This is very significant increase particularly for turbine blade application where even a small increase in strength may greatly increase the operating life of a joint for given stress conditions.

This fact is more graphically illustrated in Fig. 6 where the results of rupture tests at 932° F are shown. These tests consist in applying a predetermined load on the specimens until rupture occurs. The elapsed time before the occurrence of rupture is then taken as a measure of quality.

Increase in the operating life of a brazed joint obtained as a result of alloying copper can be compared by extrapolating the curves in Fig. 6 and measuring the time required to rupture. For example, at 10,000 psi at 932° F, the O. F. copper-brazed joint ruptured after 500 hours whereas one brazed with copper-nickel-silicon alloy ruptured only after 1400 hours, a striking increase in joint performance.

Degree of interalloying between the brazing alloy and the joined metal is influenced by the composition of the brazing alloy and this, possibly, is the explanation for the differences in the joint strength obtained with different alloys at elevated temperaures, Figs. 4 and 5.

Test Turbine Operated: A test turbine containing brazed sets of blades has been operated for 1000 hours at approximately 932° F (500° C) and 1250 psi without failure. This testifies to the ability of well brazed joints to withstand difficult operating conditions.

In conclusion it might be added that the procedures developed here by no means exhaust the possibility of further increasing the strength of brazed joints. Higher brazing temperatures, diffusion treatments, application of pressure with brazing, and combinations of these procedures hold a very definite promise of further increasing the strength of brazed joints.

Process Puts Bright Finishes on Aluminum

Mirror effects and simulated brass finishes are created on aluminum by a new process developed by Technical Processes Division of Colonial Alloys Co., Philadelphia, where the process is being applied on a pilot plant scale. According to the company, features of the process are brightening of deep recessed areas as well as the exposed surfaces and the degree of passivation or resistance to oxidation of the final surface.

Uniformly bright surfaces require the aluminum to be free of scratches, draw marks, spinning lines, etc., although it is possible to attain bright effects in spite of these marks, the marks not being eliminated in the process.

Small parts, such as aluminum nuts, screws, tubes, nails, fittings, extrusions and stampings may be handled with speed, it is reported. It has been found that the bright finishes are particularly adaptable to the wrought products of aluminum or its alloys because of their lack of surface porosity.

To some degree brightening effects on castings are possible (with the exception of those containing substantial amounts of silicon), but they cannot be considered in the sphere of reflective finishes as the roughness or surface porosity causes a diffuse brightening, the company states.

Brass finishes on aluminum require a subsequent electrochemical treatment resulting in a relatively stable brass-like finish. Almost any color of the rainbow can be produced with brilliant effects, it is reported, by first applying a mirror-like surface as previously described and then subjecting the aluminum to anodizing and coloring. The colors react chemically with the aluminum anodized surfaces and become integrally bound therein, having a relatively hard surface, long life, and resisting ordinary washing, the company states.

Broaching

(*Concluded from Page* 98)

furnish actual samples so that the broach engineers actually can "think around the parts" when dreaming up the cutting tools, fixtures and sequence.

And one more important thing. If the broach engineer can get into the picture while your production product is in the design stage, he frequently can make suggestions for slight changes in detail which will make broaching immeasurably easier and cheaper. Draftsmen and designers generally are not as well posted on broaching as they are on some other machining processes. I recommend to them a book entitled "Broaches and Broaching", by W. Wilson Burden. It is available for $3 from the Broaching Tool Institute, 74 Trinity Place, New York 6, N. Y.

A few years ago one could count the types and sizes of broaching machines on the fingers of one hand. Today there are fully as many as there are in the case of milling machines. Some are horizontal, these now being used for external as well as internal work. Others are vertical, many of them having double slides so that the operator loads work at one position while it is being broached in the other. That is one broach engineering answer to the problem of "idle time".

The original vertical machines were of "pull up" type. Work is supported above, and is put on over the front pilot of the broach. It is removed after the broach has been pulled through. In the "pull down" type, work rests on the table, the front pilot is passed through, the puller head takes hold, the top head releases and the broach is pulled down. Then work is removed and an automatic handler returns the broach to starting position.

As a general rule, high production surface broaching is done in vertical ram machines which cut downward. These machines occupy small floor space in relation to their "tonnage" (cutting power) and are convenient to tool and to operate. The operational and space saving advantages of vertical machines are illustrated in the illustration on the left hand page of the two-page spread at the beginning of this article. This shows a powerful double ram machine at work in the Chevrolet plant.

Turning now from small work on a vertical machine to big work on a horizontal machine, consider the illustration at the lower left of the right hand page of the spread just mentioned. This is an automotive cylinder block as handled in a Cincinnati Hydro-Broach. The runs involved on this job justified highly developed special tooling designed to broach several surfaces at one pass. These tools, produced by National Broach & Machine Co., machine surfaces for inspection plates, tappet covers and also the half round groove for cylinder block support.

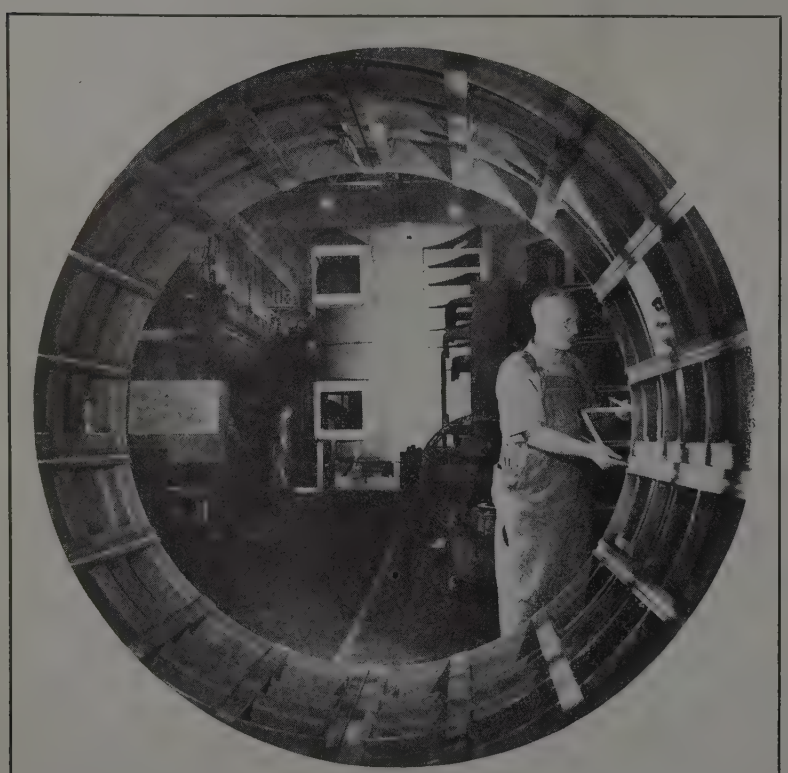
Not only are these tools made up in sections, but also—in the case of the slabbing broaches—they have individual, removable, inserted teeth similar in design and locking to those in big, heavy duty milling cutters. The round sections have "double life". They can be turned over, thus presenting an entirely fresh set of half round cutting teeth.

The illustration at the right of the right hand page of the spread shows one phase in the broach machining of slotted counterweights for aircraft engines. This work is being done in a horizontal machine of 72 in. stroke and 25 ton capacity, machine, tools and fixtures being designed by the Colonial Broach Co. This is one of five broaching operations involved—this being No. 1 in which the partially milled slot is squared up at the ends.

Turning now to the illustration on the third page of this article, we see a Lapointe horizontal machine set up to cut the multiple splines in reduction gear hubs of Pratt & Whitney aircraft engines. This is high precision work with limits of plus or minus 0.0002-in. Such limits demand extreme care in manufacture of broach and fixtures, and their setup in the machine. Once established in the setup, however, the accuracy is reproduced in the work rapidly and throughout long runs.

In closing this sketchy article on the big and constantly expanding subject of broaching, let me emphasize again that every job presents its own special problems. With special broaches in larger sizes costing several thousand dollars, it is no field for amateur experimentation either in design or application. One simple error in judgment, such as allowance of insufficient chip room, or inadequate support of work or broach may defeat the whole program.

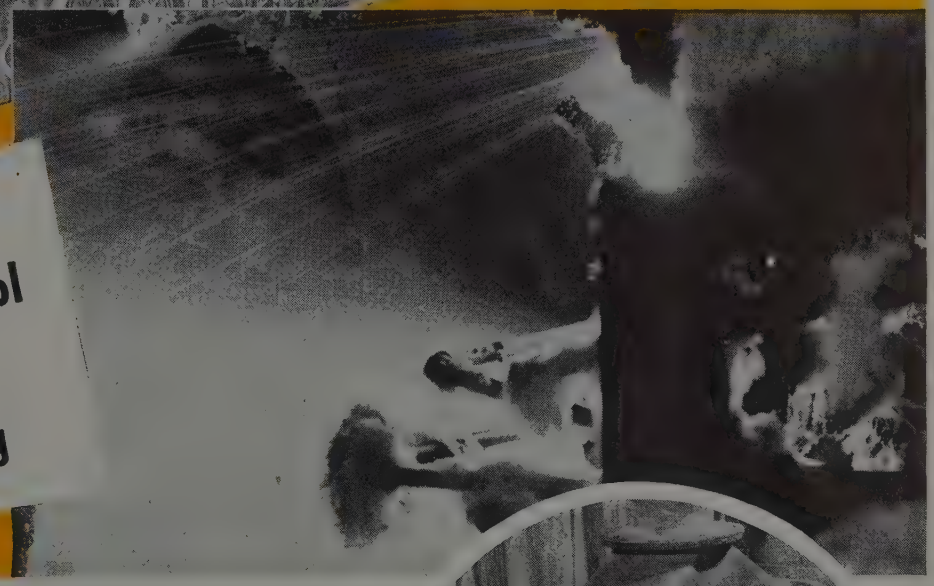
Progress in broaching—especially surface broaching—has been and is so rapid that only those who are consecrated to it are up-to-date on all its many phases. While it isn't a universal "cure-all", it certainly deserves careful investigation on every long run job involving internal or external surface machining—especially on small and medium size work involving unusual shapes. Trust your broach engineer just as you do your doctor or your lawyer.



MORE KW CAPACITY: Working to replace worn-out electric generating equipment, the East Pittsburgh plant of Westinghouse Electric Corp. has under construction machinery capable of generating millions of kilowatts of electricity for factories and homes. In the foreground, a workman is locating points at which holes will be drilled in the inner frame of a powerful generator. Outer frame of similar machine is seen in the background

71-YEAR-OLD ROOTS BLOWER STILL ON JOB

. . . making mineral wool from iron slag



This cupola blower, fitted with wooden impellers, was installed in 1876 at the Stanhope (N. J.), plant of U. S. Mineral Wool Company (world's oldest manufacturer of mineral wool). Used in making mineral wool insulation from iron slag, it's still working faithfully, 24 hours a day, 7 days a week.

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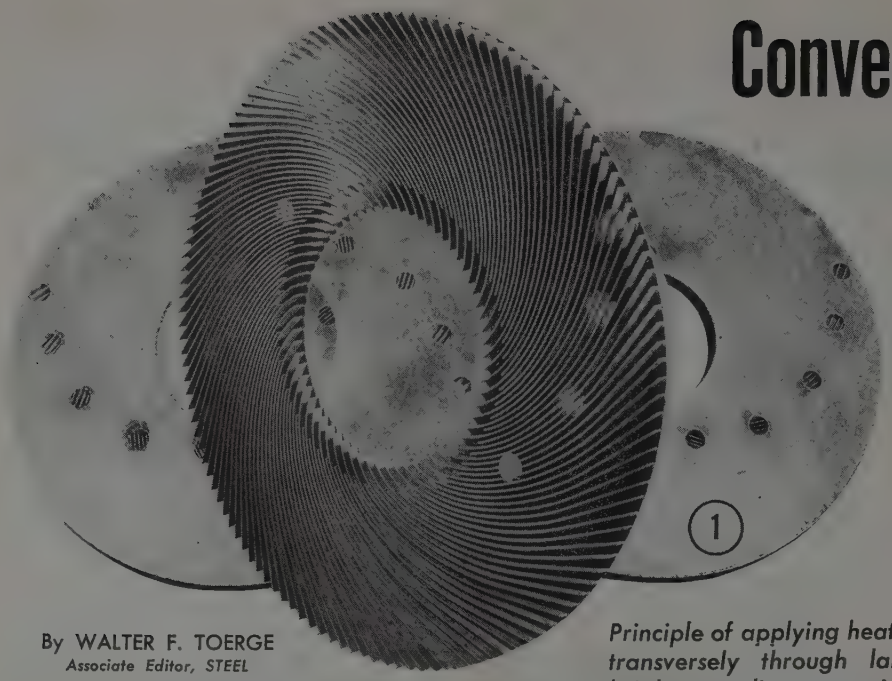
Convection Annealing

Large Diameter Tin Plate Coils



By WALTER F. TOERGE
Associate Editor, STEEL

Principle of applying heat to coil edges rather than transversely through laminations reduces total bright annealing processing time to 34 hours on 46-in. OD coil. Canadian steel plant average output is 2.8 tons per furnace hour on two-stack bell-type convection furnaces

ADDITIONAL facilities for bright annealing tin plate in large diameter coils at the rate of 3000 tons per month were installed recently at the Hamilton, Ont., plant of Dominion Foundries and Steel, Ltd. The new equipment includes several convector type radiant tube furnaces operating on the principle of applying heat to coil edges rather than transversely through the laminations.

In appearance generally similar to the familiar bell type furnace construction, the radiant convector type units developed by Lee Wilson Engineering Co. Inc., Cleveland, use a special type double walled inner cover which is placed over the stack of coils. The coils rest on a charge pedestal designed to present a flat and true supporting surface for the stack.

Gases under the inner cover are circulated through the heat transfer system by means of a large impeller type fan located under the bottom of the stack of steel coils. Innovations of this heating system are the compensating convectors or separators placed between the coils, allowing the hot gases to circulate between the coil edges; and the construction of the inner cover which improves convection transfer of the radiant heat supplied from the radiant heating tubes in the furnace bell.

The coil spacers or convectors, Fig. 1, are constructed of two pieces of mild steel plate separated by thin steel vanes or fins, the curve of which is designed to provide a uniform delivery of heat to all coil edge areas. Through these vanes, a constant mass velocity of convected gas passes from the outside to the inside of the coil. By maintaining a constant mass velocity of the gases, an equal Btu release is provided for each square inch of coil edge in contact with the convec-

Fig. 1—Coil spacers or convectors are made of two pieces of mild steel plate separated by thin steel vanes or fins. Curve of fins is designed to provide uniform delivery of heat to all coil edge areas. Spacer in foreground has top cover removed to show construction

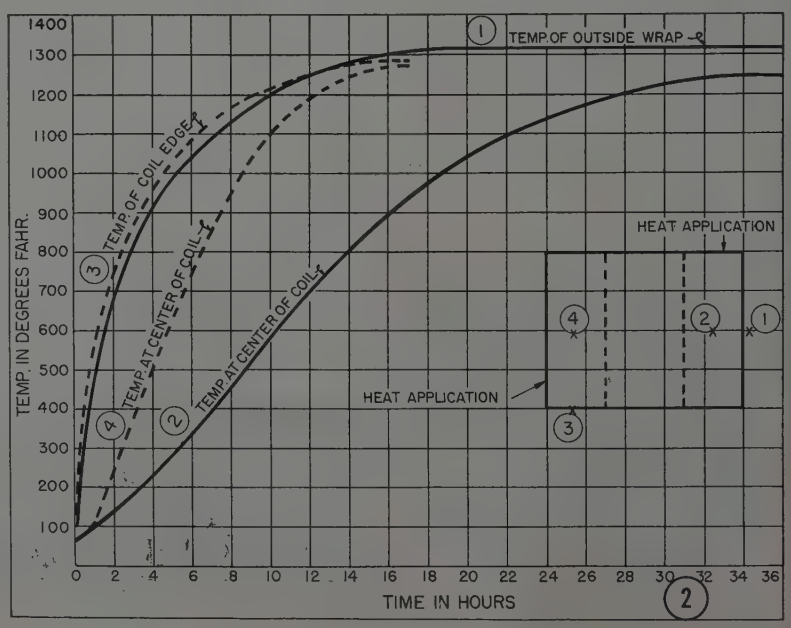


Fig. 2—Time-temperature curves for coils with heat applied to outside wraps compared to curves of same size coils with heat applied to edges

Facilities for the treatment of RAW MATERIALS

WITH the depletion of high grade raw materials the treatment of ore and coal is assuming increased importance. While this is a comparatively new development in the Iron and Steel Industry, the McKee organization has already gained wide experience in this field.

For many years McKee has been designing and building plants for concentrating, sizing, blending and the agglomeration of iron ores. The use of the bedding system for accurate blending of iron ores was initiated by McKee. Plants built by McKee for the beneficiation of specific ore deposits in England and Russia are the most complete and among the largest in the world. The correctness of the flow sheets devised, the equipment selected, and the design of these plants has been thoroughly demonstrated by the performance of the blast furnaces in which the materials are used.

With a fundamental knowledge of the requirements of the blast-furnace and open-hearth operator as well as the raw material producer, the McKee organization is making every effort to provide leadership in this field which it has maintained in four decades of engineering and construction for the Iron and Steel Industry.

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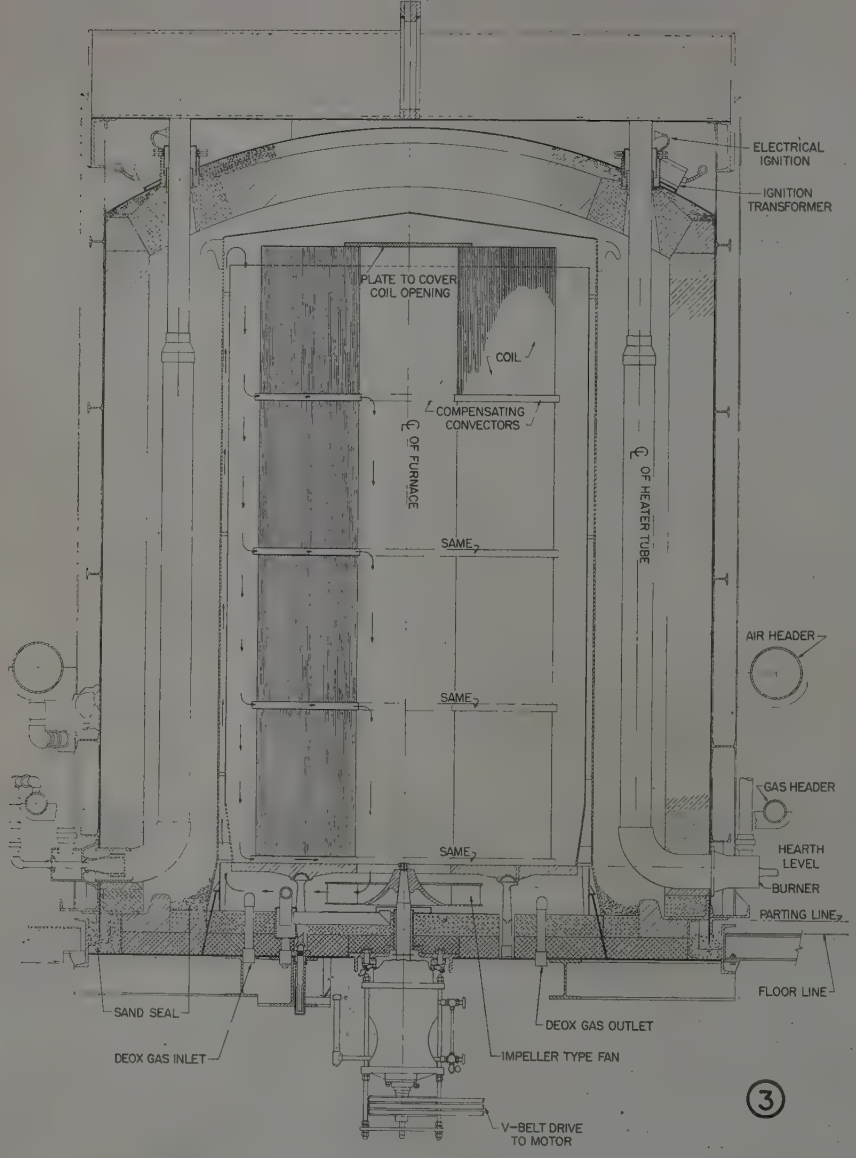

Fig. 3—Two-stack, 60 in. OD, 126 in. high annealing furnace. Relationship between radiant tube, double-walled inner cover, coils and convectors is shown. System of circulation is indicated by directional arrows

Fig. 4—Convectors and coils are loaded alternately on the base until stack is complete with four coils high

tor shown on the previous page.

According to Wilson engineers, the ability of steel to transfer heat from the coil edge inward instead of across the laminations has a practical ratio of 3 or 4 to 1. This is illustrated in Fig. 2 where a comparison is made between heating of the coil from the edges and through the coil laminations.

In the graph shown, the coil is saturated to uniformity in 17 hours when heated from the edge. With the older methods of heating, even after double the time, there is a noticeable spread between the inside and outside of the coil. To achieve the same uniformity, many additional hours of soaking time would be required. If no better uniformity is desired than is indicated by the solid lines of the graph, the annealing time by coil edge heating could be shortened.

Ability to absorb heat from the edges, when put to practical application, means that a great deal more heat must be made available in a given time than hitherto as the steel can now absorb the heat as fast as it can be delivered to it. To provide this heat, the radiant tubes are equipped with burners which vastly increase the fuel input per hour to this type of furnace; the radiating area of the tubes has been increased to release the increased input without overheating any portion of the tube.

In order to transfer this heat to the recirculating gases, a special means was devised to remove the radiated heat from the inner cover. This was done by providing an inner liner within the inner cover and approximately 2 in. smaller in diameter than the outside shell of the inner cover which furnished a gas movement space in which the velocities of movement are approximately 75 fps. At this speed, gases wipe the delivered heat from the outer inner cover wall and transfer it by convection to the convectors or coil spacers that are in contact with the coil edges.

To supply the energy necessary to move the gases through the restricted areas of the inner cover liner and convectors, a fan of much higher static delivery must be employed than has been used in the older furnace designs. This fan is of the impeller construction and has a total static spread of somewhat over 10 in. of water pressure when cold gases are circulated.

In the system this spread is divided equally between positive pressure and delivery suction. The fan, which is located under each stack of steel, rotates at approximately 1400 rpm and requires a 20 hp drive to furnish power to circulate the gases. The power requirements drop off as the temperature increases so that the total power consumption is less than half of the actual motor rating. Further developments on the part of the Wilson engineers have im-

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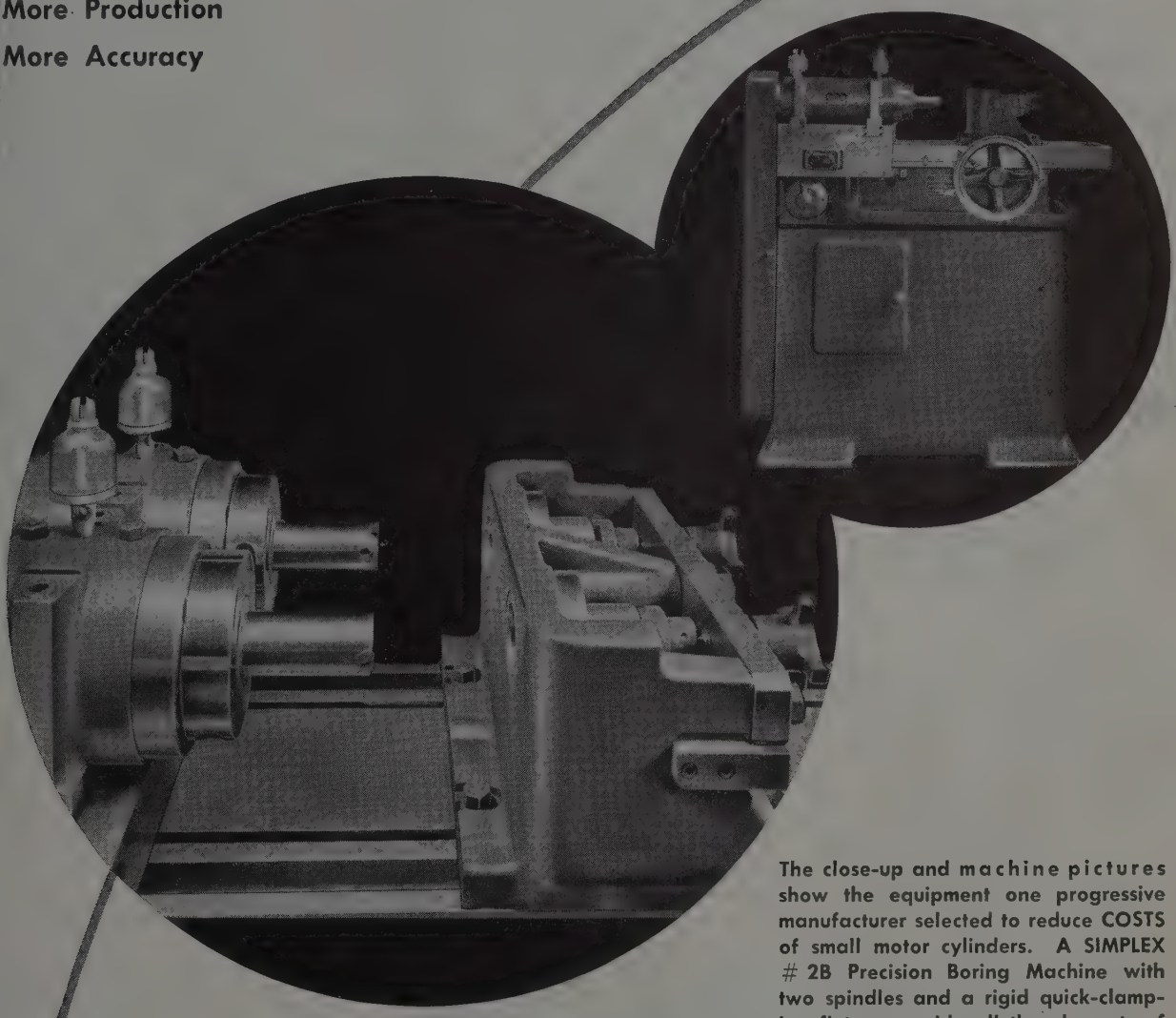

The close-up and machine pictures show the equipment one progressive manufacturer selected to reduce COSTS of small motor cylinders. A SIMPLEX # 2B Precision Boring Machine with two spindles and a rigid quick-clamping fixture provide all the elements of cost reduction listed above.

Precision Boring Machines

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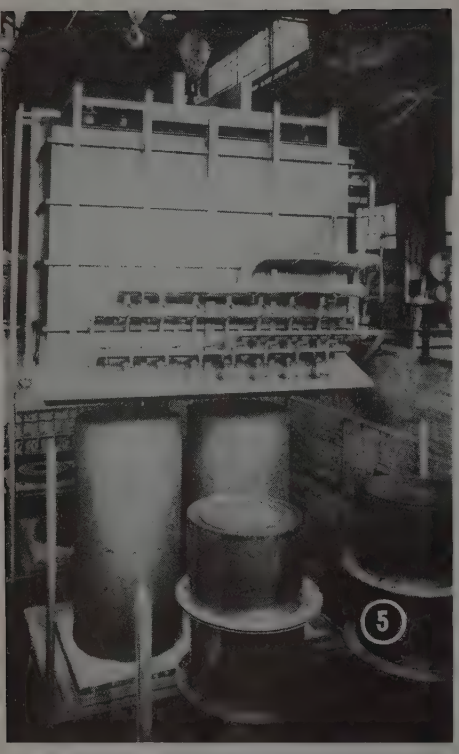

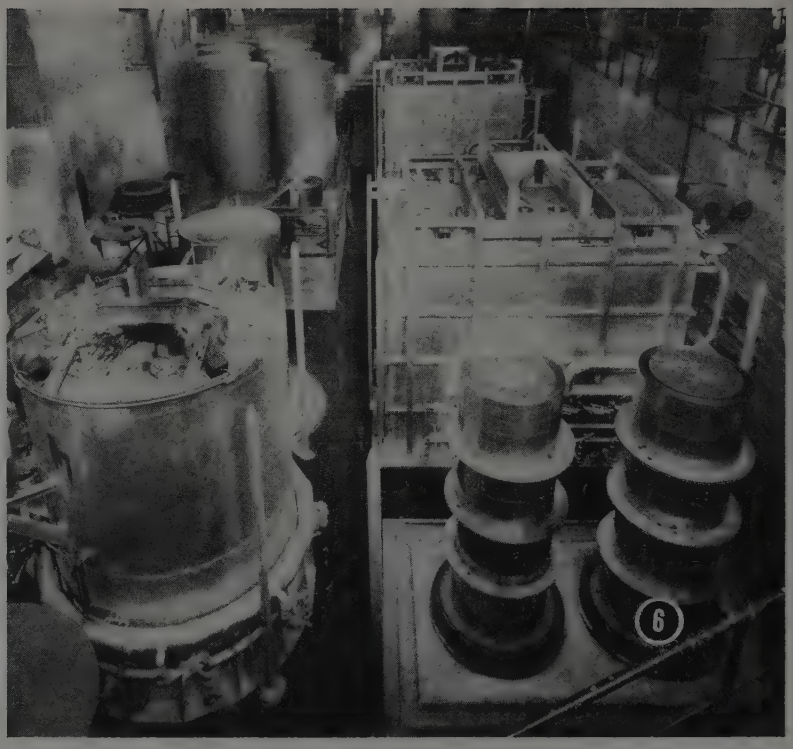

Fig. 5—Placing furnace bell over inner cover. Note uncovered two-stack base in foreground

Fig. 6—View of Dominion installation. Annealing equipment in this plant includes two furnaces of the two-stack type operated with five bases, one single stack bell type furnace used with three bases for special work on deep draw quality steels

proved the fan efficiency again so that the average power consumption of these fans will be less than 5 hp.

While this furnace (assembly of which is shown by drawing in Fig. 3) is generally known as a convection heating unit, it employs radiation, convection and conduction to heat the charge. Transfer of heat from the radiant tubes to the inner cover is accomplished by radiation; the gases are heated by convection, and the convectors, in turn, are heated by convection; from these units, the heat is conducted to the coil edges.

Furnace is equipped with a relatively small number of radiant tubes, eight per stack, which are arranged along the side wall of the furnace bell. These particular furnaces are a two-stack design, that is, there are two columns of coils loaded on each base, so there are eight tubes on each of the two furnace side walls. The radiant tubes are equipped with a type of burner known as a dual pressure unit, to which gas and air are delivered at controlled constant pressures in the nature of 17 in. of water for the maximum control valve position and of course vary downward as the valve moves toward closing.

By controlling the ratio of primary to secondary air, the flame length in the tube can be adjusted as required. In general, flame length is set up for approximately two thirds the length of the tube so that the heat release per square inch will be kept within safe limits to assure long tube life and low maintenance.

It is expected that the life of the tubes will run in the nature of 3 years or longer. The alloy used for tube material is 25 per cent chromium, 12 per cent nickel. Input per tube is in the nature of 425,000 Btu per tube per hour. The fuel used initially at the Dominion installation was coke oven gas but this has now been changed to propane delivered as a fuel diluted with air to approximately 800 Btu per cu ft.

In the operating cycles, the tubes attain a temperature of approximately 1650° F maximum, but they reach this only at the end of the heating cycle as during all this time the rate of trans-

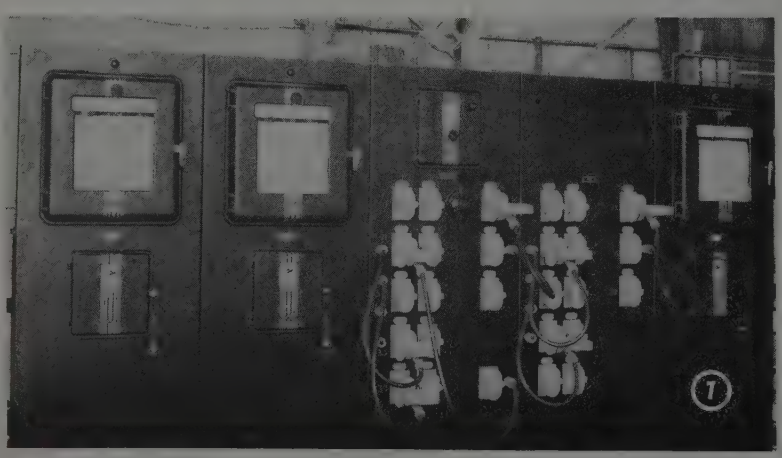

Fig. 7—Temperature control panel. Control switching arrangement allows any furnace to be used with any base with any instrument

Unretouched photo of Tube Turns forging right off the press

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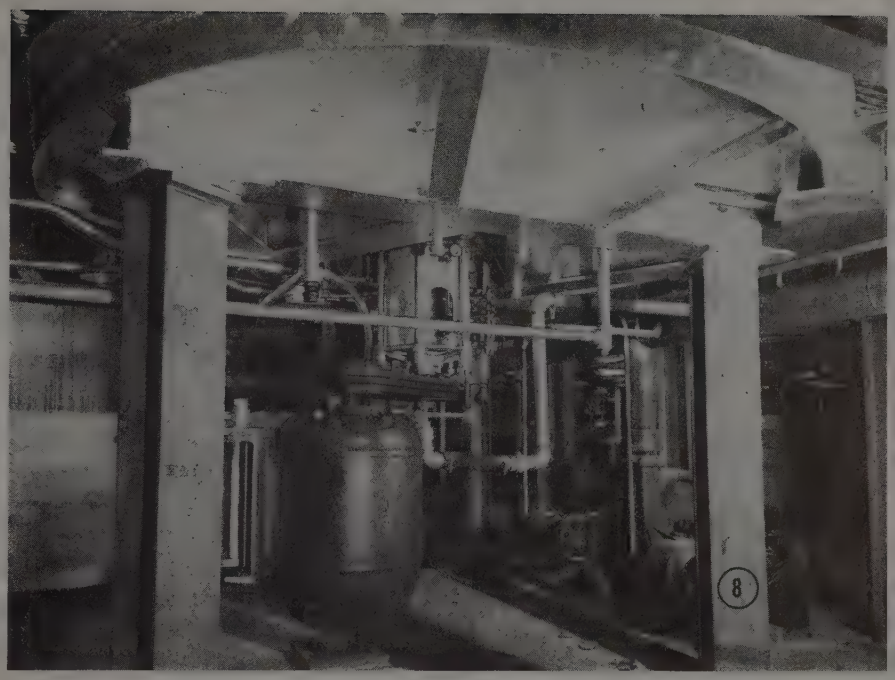

Fig. 8—Millwright's eye view of general arrangement for motor and V-belt drive

fer is so fast that the tube temperatures are kept only slightly above the temperature of the steel as it is reaching its control point. Exhaust gases from the tube travel out of the upper end of the tubes and of course are hot enough to flow immediately to the top of the building and out through the ventilators.

The furnace bell, seen in Figs. 5 and 6 is a steel casing lined largely with 2000° F light-weight brick. It is a rectangular box to which is fastened the necessary gas and air manifolds and radiant tubes; the structure is sufficiently strong so that it may be lifted by a single eye. These particuliar two-stack furnaces weigh approximately 25 tons.

Original inner covers used at Dominion were made of mild steel, the outside surface of which was not treated with any special coatings. It would be possible to construct these inner covers from heat resisting alloy or mild steel which is rolled with an alloy cladding. Coating with aluminum spray and subsequent fusing with this coating would be beneficial.

The Canadian company has a soft temper box annealing capacity of 11,000 tons of tin plate coils per month, of which the new convection furnaces handle approximately 3000 tons. Two furnaces of the two-stack type are operated with five bases. The plant is also equipped with a single stack bell type furnace which is used with three bases for special work on deep draw quality steels.

Standard gage tin plate is coiled on 20-in. arbors to produce coils weighing 11,000 lb each. The furnaces are constructed to permit the loading of 54-in. diameter coils which ultimately will be processed. When facilities are completed, 15,000-lb coils will be annealed. With the present 11,000-lb 46-in. OD coils, the average furnace production for the two-stack units, annealing tin plate at 1180 to 1200° F, eight coils per charge (44 tons) is 2.8 tons per furnace hour. This means that the furnace time for these charges is between 15 and 16 hours. Cooling time is slightly longer, approximately 18 hours.

The total time for processing a charge, both heating and cooling for bright annealing, is approximately 34 hours. This compares with a figure of approximately 100 hours for older type equipment. The single stack unit production is even higher. For the same class of work, the yield per furnace hour averages 1.75 tons as compared with 1.4 tons per hour per stack in the two-stack units.

Typical mill practice for the annealing operations at Dominion are as follows:

1. Coils are cold reduced continuously on the 42-in. reversing mill. After caustic cleaning to remove any dirt or grease, the coils are transported by fork lift truck to the annealing department which occupies one full bay in the building and which is served by a 25-ton overhead crane.

2. Convectors and coils are loaded alternately on the base until the stack is complete with four coils high, Fig. 4. This particular plant uses a mechanical grab for lifting the coils instead of lifting magnets which are sometimes used for coil handling.

3. Inner covers are lowered over the stack of coils, Fig. 6, and clean sand shoveled around the base to complete a seal between the inner cover and the base.

4. The inner covers are then completely purged of air with deoxidizing or annealing gas having an approximate analysis of 4½ per cent CO_2, 8 per cent CO, 12 per cent H_2, with a water vapor content of approximately plus 45° F dewpoint. The air is removed from the inner cover to prevent any oxidation of the steel. Purging must be complete to eliminate the possibility of an explosion when the heating bell is applied.

5. Next, the furnace bell is placed over the inner cover and connected to fuel, power, thermocouple and control circuits by flexible hose and plug connections. On the Leeds and Northrup temperature control panel, Fig. 7, proper electrical plugs and receptacles are used to connect the corresponding control instruments to the furnace just placed over the base. To provide a maximum amount of flexibility, this control switching arrangement allows any furnace to be used with any base with any instrument.

6. From this point on, the functioning of the furnace is entirely automatic. Tubes are brought up to the maximum allowable operating temperature and are held there until the charge thermocouple reaches the control point, when the transfer of control is made to the charge tremocouple.

The soaking temperature is then maintained until the end of the cycle. All instruments are 4-point recording and controlling type with two points of control, one for the tubes and one for the charge. A maximum temperature limit will shut off the gas supply if an excessive temperature is reached on the tubes. This limit switch also actuates the "howler" which appears above the instrument board to warn the operator of the process.

An indicating potentiometer is used to check the cooling temperatures on any base by plugging in a test jack in the proper base receptacle. Spring type thermocouples are used to press against bottom of bottom coil. They are inserted up through the bottom of the base through an oil seal, the spring maintaining pressure for intimate contact with the bottom coil. One thermocouple is installed at the bottom of each stack, one is in the furnace between two center tubes on one side wall, and the fourth is used for exploration check; it is connected to a long flexible thermocouple which can be extended to the top of the charge if required.

In determining the rate of heat penetration to the center of the coils, the company inserted thermocouples into the coils as they were wound on the cold

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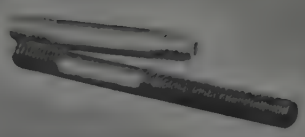

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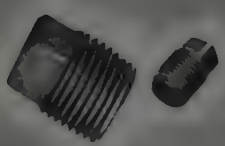

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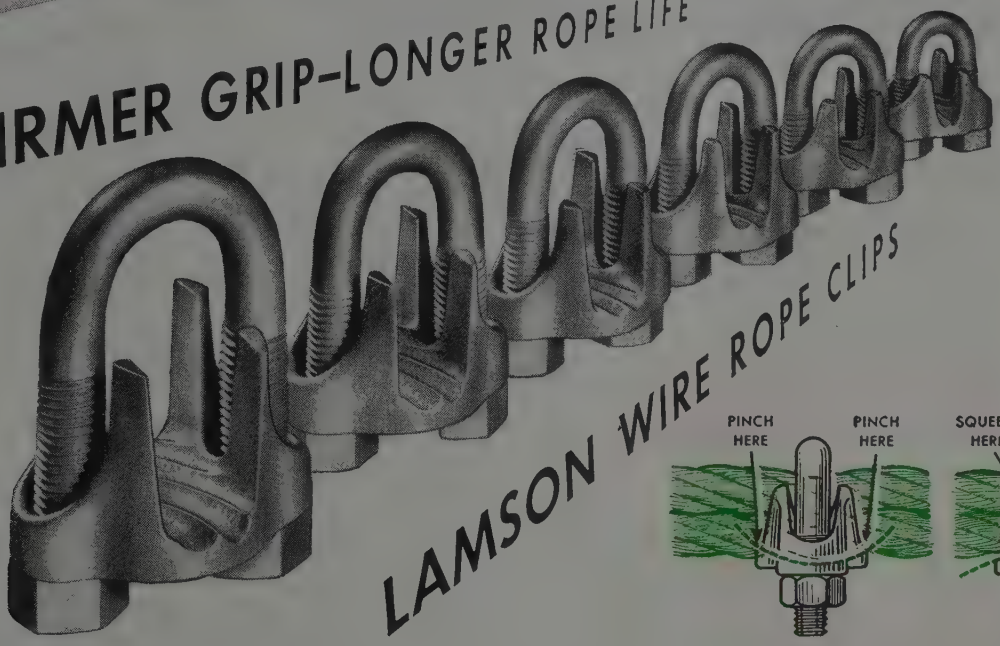

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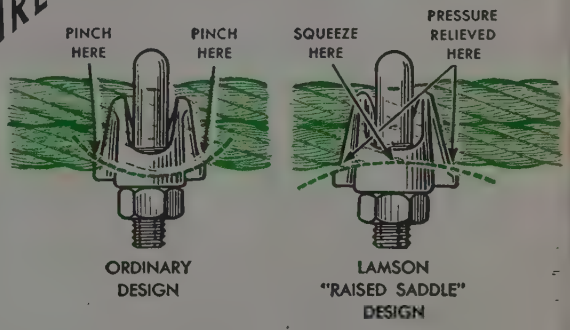

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mill. Two pieces of absestos rope, approximately ½-in. in diameter, were slipped into the coil after it had been half wound, so that a space would be left into which a thermocouple could be inserted halfway into the coil.

These thermocouples were 20-gage iron-constantan wires, protected by single hole porcelain pads for about 30 in., after which they were protected by two-hole porcelain insulators for the remainder of their length. Thermocouples were inserted in the coils and then threaded out through the existing holes in the compensating convectors and brought out of the convectors between the vanes. This testing arrangement required no special equipment and gave dependable check on temperature penetration into the coil.

7. At the end of the heating and soaking periods, the flexible connections from the furnace are broken so that the furnace may be transferred to another base which has been loaded and purged and is ready for heating.

8. The charge now cools under the inner cover at only a slightly longer time than was required to heat it. The recirculating fan continues the circulation in the same manner as was used for heating until the bottom thermocouple registers a temperature of between 250 and 300° F. When this temperature is reached, the inner covers are removed and the furnace base is unloaded by removing the coils in the convectors.

Fig. 3 is a cross section of the furnace base, with furnace and base, inner cover and charge indicated. In this view, the relationship between the radiant tube, double walled inner cover, coils and convectors are shown and the system of circulation is indicated by the directional arrows. It will be seen in this view how the total weight of the charge is carried directly into the base frame and not supported on brickwork, eliminating maintenance on the brick bases.

The impeller fan mounting is shown. The fan and shaft on which it is mounted are made from 35 per cent nickel, 15 per cent chromium heat resisting alloy. Top and bottom ball bearings retain the fan shaft and an oil seal is maintained around the shaft to prevent loss of atmosphere at this point. The entire base is gas tight. General arrangement for the motor and V-belt drive is shown in Fig. 8.

—o—

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(*Concluded from Page* 99)

reduced. This, in turn, is said to improve working conditions, permitting operation without the usual protective curtain. A header pipe located along the back of the furnaces is employed in place of a fume exhaust hood.

Use of a starting coil allows furnaces to be idle for long periods of time and yet not require costly time and effort in thawing out the solidified salt. Consisting of a chromel heating coil connected to bars which in turn are attached to a transformer, the starting coil is lowered into the furnace before the power to the furnace is shut down for any length of time.

When furnace is to be started, leads of starting coil are connected to the output leads of the transformer, the generated heat, plus that of the standard electrodes, returning the furnace to operation without other thawing. Furnaces operate from 220 v 3-phase power. Each unit is equipped with two water cooled transformers and has two sets of electrodes which are water cooled with the same cooling circuit which cools the transformers.

Automatic Temperature Control

Temperature control for all furnaces is automatic and according to recorded charts, holds the temperature of each unit to within 5° F of the temperature desired, throughout its entire depth. Controls for five furnaces are Brown electronic recording and indicating potentiometers. An extra thermocouple and separate leads connect the individual furnaces with a Leeds & Northrup indicating potentiometer for periodic checking of the temperatures. The temperature control for the high heat furnace consists of a radiamatic head in conjunction with a control of electronic type.

Bath rectification by a new principle is used in the operation of the high heat furnace, a graphite rod being placed in the bath and removed periodically. When it is removed it is found to be coated with globules of metal which have been formed by its action in reducing the metallic oxides in the bath to their basic metals. After removal, the rod is cooled, cleaned and returned to the bath immediately, the result of its use being a clean, quiet bath with no trace of decarb, the manufacturer states.

Ceramic lining in the carburizing furnace reportedly makes it capable of cyaniding at temperatures up to 1800° F. With electrodes at the bottom of the pot as in the other furnaces, the lining in this furnace is said to withstand the attack of carburizing salts so well that replacement is a forgotten factor.

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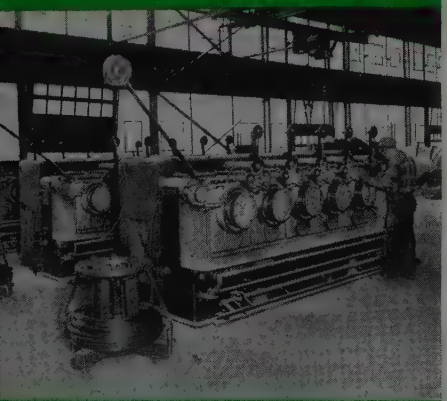

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WARREN . . . . OHIO

Office Machine Production

(*Concluded from Page* 110)

same pressure by hand, which results in a variation of the holes. But air can be regulated and always acts at the set pressure, eliminating these deviations.

Grinding of rubber plattens finds another application of compressed air with a device especially adapted to the job, as shown in Fig. 3. A small air motor is used to turn the platten during the surface grinding. Variable speeds and finger tip control obtained by this fixture permit better regulation. A study of Fig. 3 will show how the air motor speed is controlled and how it has been attached to turn the platten.

Turning out small brass rivets used in assembly of the machine is facilitated by compressed air through its application to the feed of automatic screw machines. Stock is fed into the machine by compressed air at 20 to 30 psi pressure, exact pressure being set by a regulator according to the job. Stock placed in a pipe is fed by an air-operated piston. As the machine indexes around, it opens the collet to release air pressure so the piston will push the metal into place for machining the next rivet. The loose piston in the pipe serves to seal pressure.

Another interesting application for compressed air is on the machine which drills holes in ribbon spools of balsa wood (which absorbs ink) and at the same time makes an inside and outside cut to form the spool. The wood is taped on the bottom to hold the cut pieces in place. Obviously, an operation which removes as much wood as this would foul the cutting and tear the wood to pieces were not the cuttings immediately removed by the small air jet. The jet is controlled by a pedal at the operator's foot.

An appearance of velvet nap is given the inside of the machine cover by spray painting an adhesive coat and before this coat has dried, moving the cover to an adjoining spray booth, for flocking. The fine wool fiber is blown on by an air gun in much the same manner as in spray painting. Experiments in sifting this material showed that the fibers would lie flat, which does not provide the velvet look desired. When the air gun is used, however, the fibers stand on end. This results in better appearance and in a higher degree of sound deadening, which is an important consideration in the unobtrusive use of the shorthand machine.

Past the experimental stage on its new machine, the San Diego manufacturer is carefully laying the groundwork for quantity production. These plans call for adding other compressed air-operated equipment to other commonly used equipment such as air squeezers for forming and riveting, and other types of air clamps.

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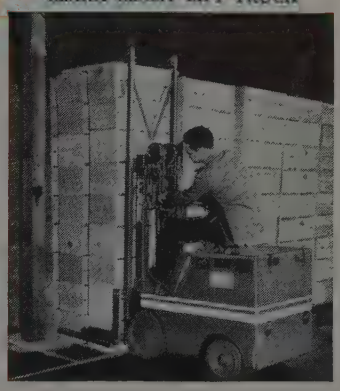

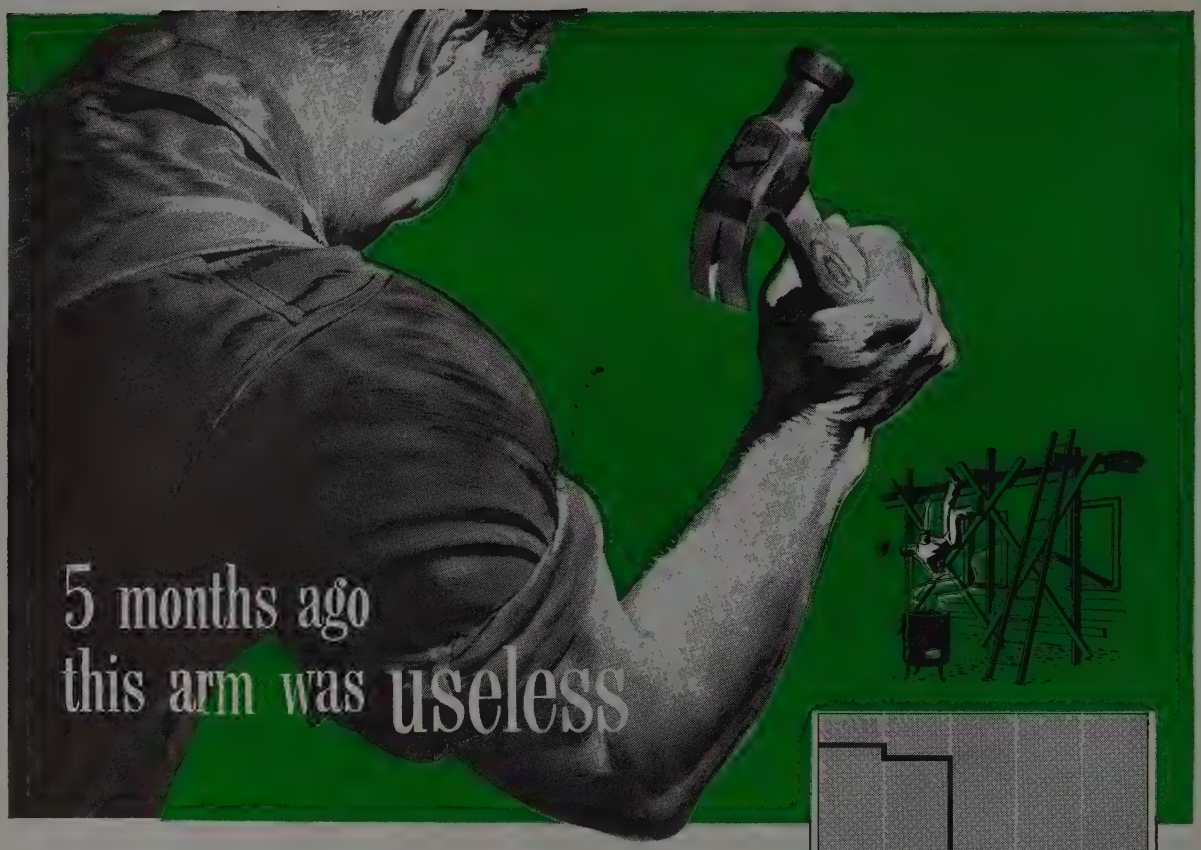

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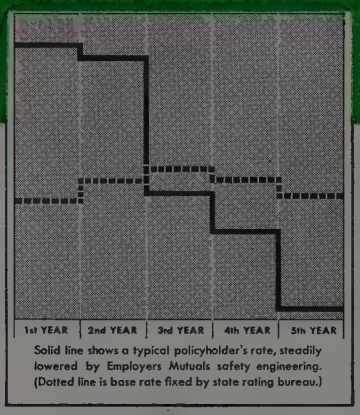
For a simple explanation of the insurance that will protect you, get in touch with the Employers Mutuals man.

He will give you full information on Public Liability . . . Automobile . . . Plate Glass . . . Burglary . . . Workmen's Compensation . . . Fidelity Bonds . . . Group Disability (Health, Accident, Hospitalization and Surgical Benefits) . . . and other casualty insurance . . . Fire . . . Tornado . . . Extended Coverage . . . Inland Marine . . . and allied lines of insurance. All policies are nonassessable.



Solid line shows a typical policyholder's rate, steadily lowered by Employers Mutuals safety engineering. (Dotted line is base rate fixed by state rating bureau.)

Write on your business letterhead for this fine new *Dictionary of Insurance Terms.* It will help you to understand insurance. Address: Employers Mutuals of Wausau, Wausau, Wisconsin.

EMPLOYERS MUTUALS OF WAUSAU . . . make insurance understandable

EMPLOYERS MUTUALS OF WAUSAU

EMPLOYERS MUTUAL LIABILITY INSURANCE COMPANY OF WISCONSIN
EMPLOYERS MUTUAL FIRE INSURANCE COMPANY
HOME OFFICE: WAUSAU, WISCONSIN
Offices in Principal Cities—Consult Your Telephone Directory

More Accurate Templates Made from Lofts

Templates made from lofts, a method which is said to save not only time but money, has been adopted by Glenn L. Martin Co., Baltimore. Suggested by an employee, Irving M. Sparrow, the method is used for templates where the photographic projection of the loft is not practical because of the waste of galvanized metal incurred in projecting the focus points together with the loft layout of the details and the excessive handling of large sheets of galvanize.

First step in the suggested method consists of spreading a thin film of oil on the template and laying vellum paper on it, rubbing until it adheres smoothly. The outline of the part shows through the paper more clearly than without use of oil. being easier to trace on paper, using a hard pencil. A thin coating of clear oil is spread on the galvanized metal for the second step, eliminating painting of the metal.

The paper, with its traced outline, is placed on the metal and rubbed until it is smooth and adheres to the metal by suction. Final step is to saw to outline, through paper and metal and file to final dimensions. The oil does not blur the pencil tracing, it is reported, but makes it show up more clearly. Templates may also be made from check blocks by the new method, Martin states.

Bituminous Coatings Widely Used in Britain

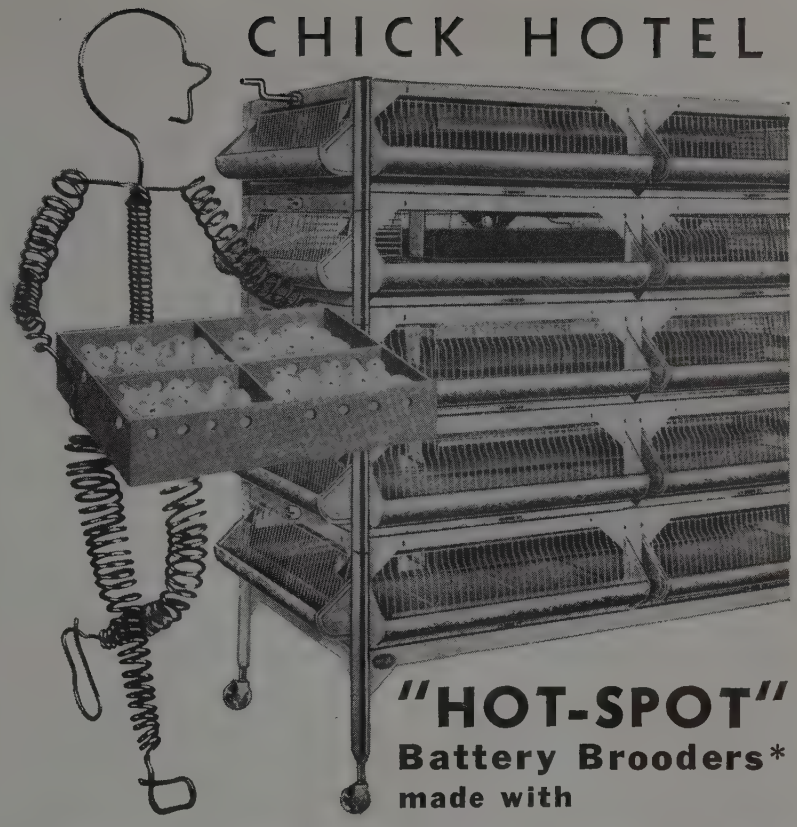
Bituminous coatings, seeing wide use in Great Britain for the protection of iron and steel against corrosion, have inherent features which qualify them for this work. Such coatings comprise both natural and manufactured products, the latter including blends with oils, resins, rubber, waxes and other substances.

Generally coatings of this type are used in a plastic form, applied hot and furnishing a thick and almost impermeable covering upon cooling, or by spraying, being allowed to dry by evaporation of the carrier solvent. These data are from a report compiled and published by the Chemical Research Laboratory of Britain's Department of Scientific and Industrial Research, on the use of these materials for the protection of iron and steel again corrosion.

Coal tar not only forms a source of compounds, but is also used directly after simple processing, for many industrial processes. Tar was a replacement or substitute for many imported materials during the war, and is now seeing widespread use.

In the section on pigments, those that have been commonly used in oil type

CHICK HOTEL



"HOT-SPOT"
Battery Brooders*
made with

KEYSTONE WIRE

Here's a five-story chick "hotel" with automatic heat on every floor . . . keeps the chicks comfortable even when the room temperature goes down to 40° or lower. Wire side grills permit the chicks to reach through to the feeders and waterers. These troughs can be filled from the outside, saving hours of time and work. Chicks are raised on wire-mesh floor — an important sanitation feature.

As you can see, wire plays an important part in the construction of "Hot Spot" brooders. It is essential that the wire have good spot-welding characteristics, be well galvanized to resist rust, and bright and shiny for sales appeal. Silver-bright Keystone wire provides these qualities, just as other special Keystone wires meet manufacturers' exacting needs.

Whatever your wire requirements, Keystone can normally supply them.

*Klein Manufacturing Co.
Burlington, Iowa*

KEYSTONE
MUSIC SPRING WIRE
KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

SPECIAL ANALYSIS WIRE
for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

Herringbone

In the actual fish, the herringbone occurs in a set angle designed by Nature. Through selection, it had proved its efficiency. When double helical gears were first designed, it was natural to call them herringbone gears. Later, following the development of the Sykes method of generating, it was found that a 30° angle was the most practical. Through selection, this angle proved its efficiency, and was chosen as standard, because the full benefit of the helical principle is obtained with the 30° helix angle. OTTUMWA furnishes Sykes continuous tooth herringbone gears up to 10'2" diameter, 24" face, and in all pitches up to 1¼ D. P., in steel or semi-steel. We also cut blanks supplied by our customers. Our catalog shows a complete line of gears, together with a full line of SPEED REDUCERS and INCREASERS for all types of industrial drives. May we mail you YOUR copy?

ESTABLISHED 1867

OTTUMWA
IRON WORKS

OTTUMWA, IOWA, U. S. A.

anticorrosive paints are classified and discussed with particular reference to their suitability for use with bituminous media. Metal powder pigments appear to be particularly suitable for use in bituminous paints and powdered aluminum in a tar vehicle has been reported. Properties of coatings in relation to durability are discussed with reference to thickness, solubility, permeability, adhesion, water absorption and oxidation characteristics.

Another outstanding use of bituminous coatings is as antifouling compositions on ocean going ships. The effect of fouling in increasing running and maintenance cost may be more important than that of corrosion, speed being reduced and fuel consumption increased.

Antifouling and corrosion resisting problems are closely associated, the report states, and bear investigation together. Compositions containing toxic pigments that gradually leach out into sea-water, are used to reduce the incidence of fouling. The commoner antifouling pigments comprise mercury and copper derivatives, but organic compounds, some in combination with arsenic, mercury or copper are being increasingly used.

Room Temperature Aging of Aluminum Castings Beneficial

Difficulty in surpassing elongation requirements with heat treated aluminum alloy castings may be met by aging the castings one day at room temperature after quenching and before artificial aging at 310°F, reported R. A. Quadt, research metallurgist for Federated Metals Division, American Smelting & Refining Co., New York. Speaking before the American Foundrymen's Association convention in Detroit recently, he brought out the fact that if aging at elevated temperatures is conducted immediately after quenching, high strengths and hardness are obtained at the expense of elongation.

His advice is qualified as pertaining principally to those aluminum alloys in which Mg_2Si is the hardening compound precipitated upon aging. Two such alloys are 7 per cent silicon, 0.3 per cent magnesium and 1 per cent copper, 5 per cent silicon and 0.5 per cent magnesium. Those alloys which contain as much as 4 per cent copper and are hardened by the precipitation of $CuAl_2$ are not affected, he stated, and cannot be improved by time delays at room temperature.

From his field experience, it has been found that the time at room temperature between quenching and artificial aging is one of the few variables seldom subjected to scrutiny. Nonmetallurgical

I am a better typewriter because of Pennsalt descaling

HOW SMITH-CORONA PUT A BETTER NICKEL PLATE ON BRASS AT LOWER COST

To remove fire scale from brazed brass typewriter parts, L C Smith & Corona Typewriters Inc. had been pickling the parts in muriatic acid. They followed this with a scratch brush to remove smut. At best, the job was slow, and it was felt that the number of nickel plating rejects could be reduced.

The Pennsalt field representative spotted the trouble, and recommended a Pennsalt pickling medium. Result? Much superior pickling . . . scratch brushing eliminated. ". . . but best of all," said the plater, "the resulting plate is better, with little or no rejects."

. . . Send for case report

If you'd like more details on this case, write us for Case Report No. 62-7. It gives full facts on this job, plus interesting data on the Pennsalt product used. And it shows the kind of service you can expect when Pennsalt know-how goes to work for you.

PENN SALT

CHEMICALS

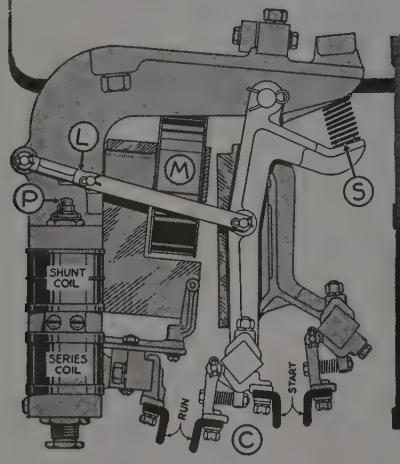
98 YEARS OF SERVICE TO INDUSTRY

PENNSYLVANIA SALT MANUFACTURING COMPANY

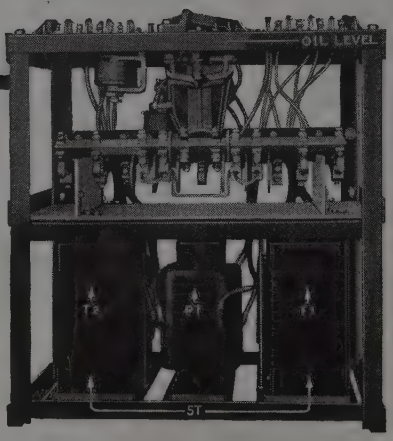
SPECIAL CHEMICALS DIVISION • 1000 WIDENER BUILDING, PHILADELPHIA 7, PA.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • WYANDOTTE • TACOMA • PORTLAND, ORE.

Inherent Interlock between Start and Run Promotes Safety, Reduces Maintenance on This 2300-Volt Motor Starter



Side view of Contactor.



Potential transformer (PT) mounted between auto-transformers (T1 & T2) supplies low voltage for the Push Button circuit.

THIS EC&M automatic Motor Starter for reduced voltage starting of 2300 volt squirrel-cage or synchronous motors uses a simple double-throw contactor (C). The interlock (L), between the starting and running contacts, is inherent in the basic design.

The single operating magnet (M), when energized by the push button, closes the starting contacts, connecting the motor to reduced voltage. When the motor accelerates to the proper speed, a current limit relay raises plunger (P) to trip the mechanical interlock (L). The running contacts then close, connecting the motor across the line. During transition, continuous torque is applied to the motor.

There is no other starter built like this EC&M automatic. Magnetic overload relays of the non-creeping, drop-back type are enclosed above the conduit connection box. Door permitting access to them is arranged for padlock. Meters are optional. Investigate these 2300 volt starters. Bulletin 1047-C, describing them, will be sent promptly on request.

BULLETIN 1047-C STARTER IN STANDARD TYPE II (drip-tight) ENCLOSURE.

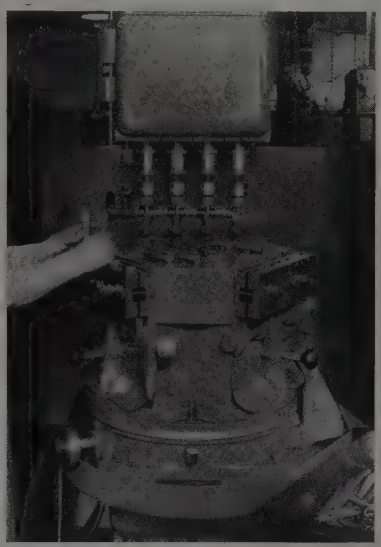
THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

considerations of furnace availability and labor-shift changes are the causes, Quadt states.

In some instances quenched castings are immediately transferred to an aging furnace, in others they are held for a night shift; occasionally, weekend holidays involve three or more days of time lag, he found. Observation of different physical properties obtained with apparently identical melts, except for these delays, made him start his investigation, Quadt stated.

Alloy Steel Taps Increase Parts Production

Use of chrome-cobalt high speed steel taps has enabled a Detroit automotive parts manufacturer to tap 2 ¼-in. deep undrilled holes in SAE 1020 cold rolled steel turnbuckles at the rate of 12,000 pieces per machine per 24 hour day,



it is reported. These parts, formed by rolling cold-rolled flat stock, are tapped for this distance in each end.

Edges of the formed parts, made by Thompson Products Co., Detroit, are left open for easy adjustment of the front car wheels. Thus the inside diameter of the turnbuckle which is later tapped is neither a machined surface nor a drilled hole. Due to the method of making these parts, the tolerances allowed are rather generous, the inside diameter being held to 0.626-0.633-in. and the outside diameter to 0.870-0.880-in.

The manufacturer uses a specially designed multiple tapping head as shown accommodating four taps and fixtures which permit fast manual loading, automatic clamping and automatic unloading at the end of the tapping cycle.

The alloy steel tap, developed by Detroit Tap & Tool Co., Detroit, has been

DISSTON CROLOY AIR HARDENING STEEL

FOR HIGH WEAR RESISTANCE AND LONG PRODUCTION RUNS

THE patented analysis of Disston Croloy, plus the exercise of great care in melting, rolling and annealing, have resulted in the production of a tool and die steel of exceptional service qualities.

Croloy provides very high resistance to wear, both sliding and impinging. It is unsurpassed for cold working tools and dies, for long run operations and for achieving a high degree of accuracy in the finished product.

Though Croloy possesses air hardening properties, it machines more easily than other high-carbon, high-chrome steels. And it produces a uniform hardness and fine grain throughout all sections of the tool or die.

Use Croloy for dies used in blanking, drawing, extrusion, forming, lamination and thread-rolling. Use it as a hob steel for the making of plastics molds. Use it for punches, shears, planer knives, slitting cutters, gauges and similar items. And wherever used, you can count on Croloy for dependable performance, long wear and economy.

ANALYSIS

Carbon	1.50%
Chromium	12.00%
Vanadium	1.00%
Molybdenum	.80%

(Produced Under Patent No. 1,695,916)

ESTABLISHED 1840 TRADE MARK REG. U.S. PAT. OFF.

CONSULT DISSTON ENGINEERS

Regarding Your Tool Steel Problems

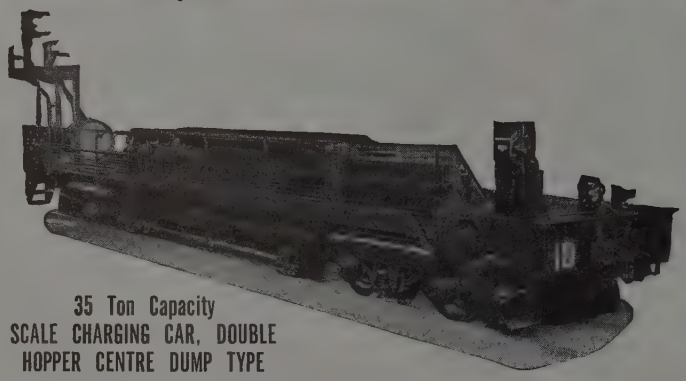
They will be glad to make available to you their vast experience in the production of tool steels for applications of every kind.

STEEL

Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills.

HENRY DISSTON & SONS, INC., 726 Tacony, Philadelphia 35, Pa., U. S. A.

ATLAS
SCALE CHARGING CARS



35 Ton Capacity
SCALE CHARGING CAR, DOUBLE HOPPER CENTRE DUMP TYPE

Equipped with Atlas Indicating and Recording Dial. Car is provided with extra-heavy all steel roller suspension scales having removable knife edges. Also equipped with centralized lubricating system.

20 Ton Capacity
BOTTOM DUMP SCALE CAR

For use with roller bin gates. Equipped with Atlas underslung roller suspension scales and Atlas Indicating & Recording Dial.

Builders of:

DIESEL ELECTRIC AND STORAGE BATTERY LOCOMOTIVES FOR INTRAPLANT HAULAGE

SCALE CHARGING CARS AND ORE TRANSFERS FOR BLAST FURNACE STEEL PLANTS

COAL CHARGING CARS, CLAY CARRIERS DOOR EXTRACTORS, COKE GUIDES AND COKE QUENCHING CARS FOR BY PRODUCT COKE PLANTS

TURNTABLES

INDICATING AND RECORDING DIALS FOR WEIGHING SCALES

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

7100 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

found by Thompson to turn out as many as 500 finish tapped turnbuckles before regrinding became necessary. It was also found that these M-11 taps could be reground eight times before stopping. Machine used has a spindle speed of 250 rpm with a reverse speed of 500 rpm for backing out the tools.

SAE Issues 37th Edition of Handbook

War-developed data and new standards, plus material revised from 36 prior editions is contained in the 1947 handbook published by the Society of Automotive Engineers Inc., New York.

Featured among new data are the first specifications for hydraulic brake fluids, standards for involute serrated shafts, nomenclature and definitions for three types of crankcase oil, standards for pipe, filler and lubrication fittings, specifications for automotive steel castings and general information on welding electrodes and on copper and silver brazing.

To facilitate further use of the handbook material, six pamphlets, each printed from a section of the handbook, have been made available. These are: Iron and Steel Standards and Specifications; Nonferrous Standards and Specifications; Standards for Rubber Compounds, Hoses, Brake Cups and Brake Fluid; Standards for Storage Batteries for Motor Vehicles; Standards for Lighting Equipment and Photometric Tests; and Standards for Splines and Serrations.

Spectrochemical Analysis Samples Report Prepared

Current information on standards and pure materials for samples used in quantitative spectrochemical analysis is contained in the 1947 revised report of the spectrochemical committee of the American Society for Testing Materials, Philadelphia. Many changes in the supply of standard materials are noted and many new ones have been made available. It has been found that the rapid growth of this testing method and the corresponding increase in available standard samples has called for a periodic compilation of types of sources of standards.

Following an introduction describing the scope of the report there are listed in the form of extensive tables and tests available standards on iron and steel, aluminum and its alloys, magnesium and alloys, zinc, lead and tin alloys and copper alloys. Miscellaneous materials include: Steel-making alloys, ores, ceramic materials, mixtures and solutions, pure metals and salts and electrode materials. Organizations supplying the material are noted.

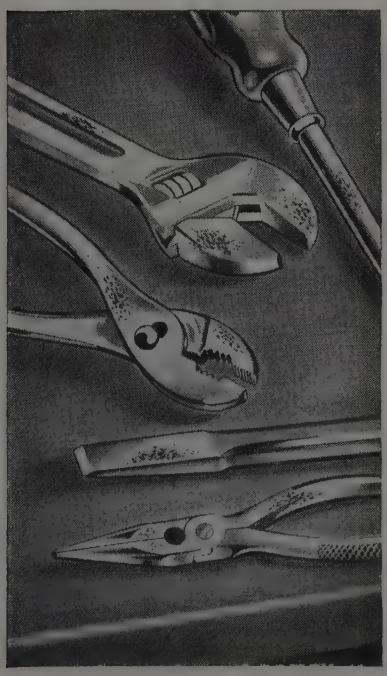
$100,000 Worth of Hand Tools saved from "RUST"

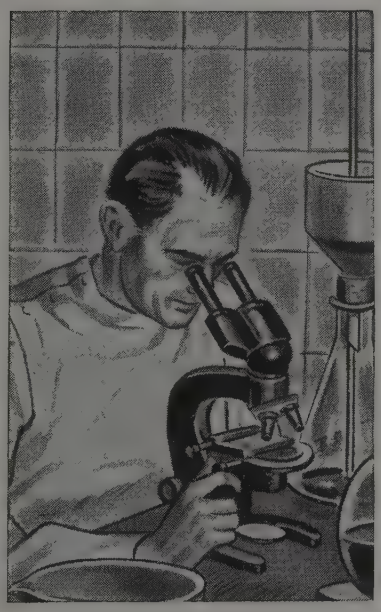
NEW PRODUCT DOES THE JOB AFTER PLANT CONDUCTS EXHAUSTIVE TESTS

"Some time ago, we were called in by a prominent manufacturer.* Corrosion of all metal parts in his entire plant had gone out of control. The machine shop and hand tools, valued in excess of $100,000, were a sorry looking 'dusty-brown.' Everything they had used in the way of rust preventives heretofore failed to solve their difficulty.

Lubrication Engineer's Report

"After studying their problem we recommended our General Purpose Anti-Corrode No. 100 and suggested that they give it exhaustive tests. Their chemist did so and we are happy to report that it solved their problem.





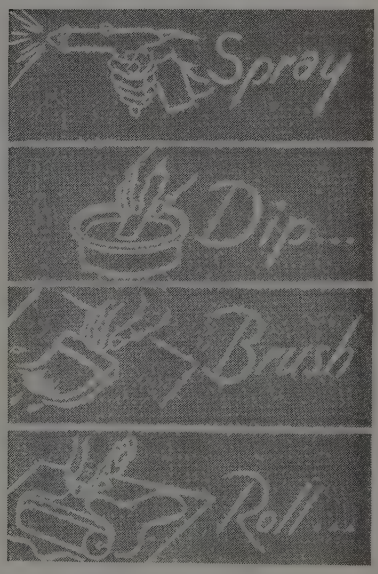
Used on Hand Tools As Well

"They have since used over 150 gallons of this Anti-Corrode on everything metal in their plant, including small hand tools such as pliers and screw drivers."

Anti-Corrode No. 100 is one of several new types of Cities Service protective coatings for metals. Designed to prevent corrosion of raw stocks, finished parts and completed machines, it adheres firmly, displaces moisture and protects longer than many materials now on the market.

Easy To Apply

Apply Anti-Corrode by ordinary work-shop methods. Spray, dip, brush or roll it on. The protective film is continuous and non-porous—does not break at sharp edges nor rupture on flat surfaces. It need not be removed from metal to be stamped, drawn or otherwise formed.



Write For Demonstration

Cities Service will demonstrate the many advantages of Anti-Corrode to you in your own plant. Contact the branch office nearest you or write Cities Service Oil Co., 60 Wall Tower, New York 5, N. Y.

**Name on request*

Cities Service means Great Service

CITIES SERVICE

Cities Service Oil Co. NEW YORK · CHICAGO

Arkansas Fuel Oil Co. SHREVEPORT, LA.

(This offer available only in Cities Service marketing territories East of the Rockies.)

CITIES SERVICE OIL COMPANY
SIXTY WALL TOWER
NEW YORK 5, N. Y., ROOM 1!0

Gentlemen: I'd like to test ANTI-CORRODE No. 100 on my own equipment FREE OF CHARGE. Send me details.

NAME .....

COMPANY .....

ADDRESS .....

CITY ..... STATE .....

Is there an idea here for your business?

How a violin bow maker licked a tough swaging job

FOR centuries, violin bow makers depended on hand craftsmanship for the fine qualities essential in a violin bow. Then one manufacturer got an idea that he could mass-produce high quality bows at a popular price—by substituting steel for the traditional wood.

But could any steel produce a bow with the fine taper, flexibility, strength, light weight and delicate balance demanded by fine artists?

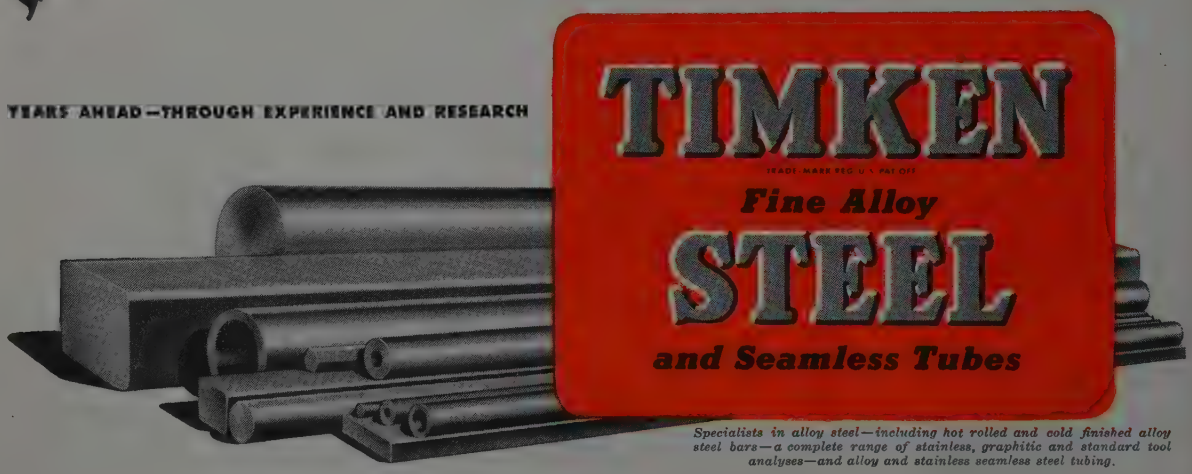
The manufacturer licked this problem by teaming up a special swaging process of his own design with high quality Timken seamless alloy steel tubing.

Timken tubing has a uniform grain size which helps maintain straight-grain structure in drawing the steel. Its excellent response to heat treatment helps prevent brittleness or "warping" in the bow. Cleanliness and uniform chemical composition in each shipment of Timken tubing assures a consistently fine product.

The Timken Company's long experience in selecting the best analysis for the job and its complete control of every step of Timken alloy steel production have helped many manufacturers improve products, reduce costs—or *both*. If you use alloy steel tubing in your product, why not consult our Technical Staff? Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

Violin bow made by James Heddon's Sons from Timken seamless tubing drawn by Summerill Tubing Company.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



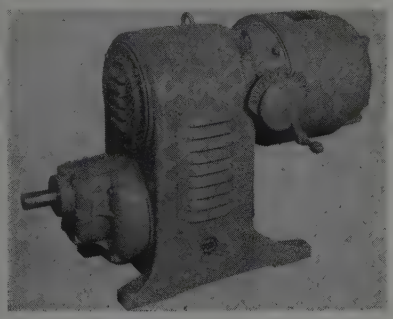
Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 158

1. Variable Speed Drive Unit

Features of the variable speed drive units manufactured by U. S. Electrical Motors Inc., Milford, Conn., include small size for given horsepower, long belt life, convenient positioning of speed adjusting handwheel and provision for easy change of belts. Designated as Size 23, units have a variety of assem-



blies to fit almost any application, such as horizontal frame with shaft left or right, upright frame with shaft high or low and built-in speed reducers of single or double reduction. Speed variations of 2:1 to 7:1 are obtainable with up to 5 hp output.

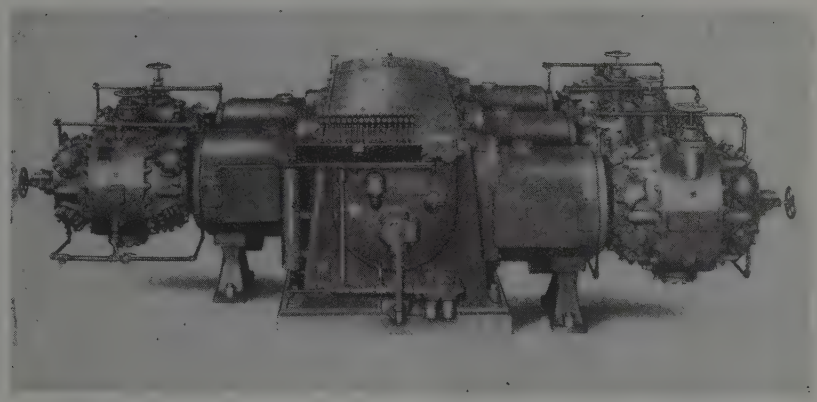
2. Revolving Stop

With free-turning ball bearing head, the revolving stop for screw machines, made by Boyar-Schultz Corp., 2110 Walnut street, Chicago 12, reduces friction between work and stop, preventing marring of piece parts. Due to its design it helps eliminate variation in piece part lengths. It is made in three sizes, 00, 0 and 2, and in seven lengths. Hardened or soft semifinished heads are available.

3. Fork Truck

Designed for outdoor work and operation on uneven surfaces, the Yardlift-40, introduced by Clark Tructractor Division of Clark Equipment Co., 258

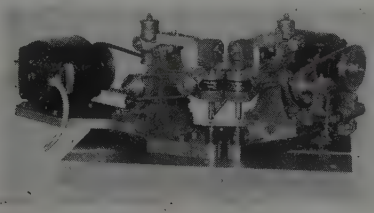
West Champion street, Battle Creek, Mich., has a capacity of 4000 lb at 24 in. and a lift of 120 in. with an 85½-in. overall height.



Center-pivoted steering axle mounting, 4-wheel stability and pneumatic tires of the truck make for smooth operation over uneven surfaces. Heavy duty transmission provides speed of 9.4 mph in high and 2.9 mph in low, forward and reverse. A mechanical governor assures better carburetion and eliminates frequent adjustments. Tires may be changed by removal of demountable rims secured by four lugbolts.

4. Riveting Hammer

With two heads for forming two rivet heads simultaneously, a new bench type riveting hammer, made by High Speed Hammer Co. Inc., 313 Norton street,



Rochester 5, has a capacity of ⅛ to ⅝-in. diameter rivets. It has a minimum center line distance of 2¾-in., and a maximum of 12 in. with greater distances obtainable. Clutch mechanisms are hydraulically operated.

5. Air or Gas Compressor

Available in six sizes and with a variety of compressor cylinders, the type JM air and gas compressor, introduced by Cooper-Bessemer Corp., Mt. Vernon, O., offers a wide range of volumes and pressures. It is built with from one to six crank throws, and ranges in horsepower from 500 to 2750. Compressor stroke is 14 in. and operating speed is 300 rpm. Driving power may be taken from a synchronous electric motor, an engine or a turbine.

Compressor has a 10 1/2-in. diameter counterweighted crankshaft, supported in babbitt lined bearings. Cylinder valves are of a standard ring-plate type and are self cleaning. Valve seats are renewable and interchangeable from suction to discharge.

6. Portable Conveyor

Light in weight, a portable power belt conveyor built by Arrow Products Inc., Grand Rapids, Mich., will handle cases, boxes, bags and cartons, or equipped with a cleated belt, small parts, stampings, scrap parts or bulk material. It will handle small, hot forgings when equipped with a wire mesh belt. Called

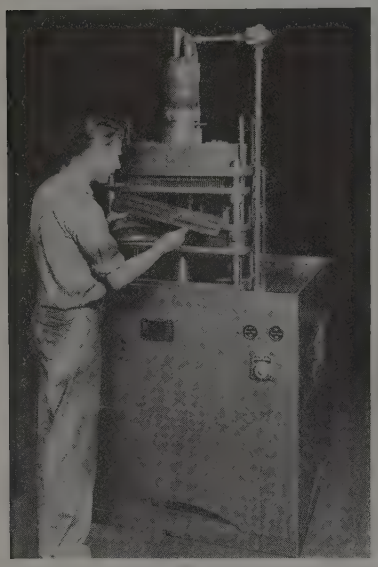
the Ele-Veyor, it is offered in 6 ft lengths with an 8 in. belt and 8 ft lengths with a 12 in. belt. Length may be increased by adding 1, 2, 3, and 4 ft bolted-on extensions.

Conveyor is equipped with an Auto Tension drive, a pivoted drive unit containing the reduction shafts and standard frame motor. Drive is by v-belt from motor to first reduction and chain driven through second and third

reductions. Two adjustable compression springs give initial driving traction; any increase in load on the carrying belt tends to increase the driving traction automatically. Conveyor is supported on an adjustable, telescoping base.

7. Hydraulic Drilling Unit

Completing 385 holes simultaneously is the accomplishment of the new gearless hydraulic drilling unit produced by Zagar Tool Inc., 23880 Lakeland boulevard, Cleveland 17. Used in the producton of gas burners, the unit uses standard threaded shank drills No. 21 (0.120-



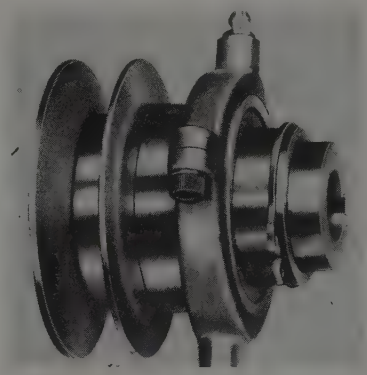
in.) and No. 29 (0.136-in.). To remove or install a new set of drills, the operator uses a pair of pliers.

Entire drilling cycle is controlled by one operating lever. A hydraulic pumping system in the base of the unit operates the motor which runs the drill head as well as the ram that brings the work piece up to the drill head. After drilling, ram returns quickly to a normal position and entire machine comes to a halt, completing the drilling cycle.

8. Friction Clutch

Designed to grip or release directly on V-belts, the Ball-Lok clutch units manufactured by V-Belt Clutch Co., 3757 Wilshire boulevard, Los Angeles 5, are complete in themselves and may be used either as driving or driven pulleys. In operation, the smooth clutching action is the grip of the side-walls of the pulley against the belt. When the clutch is opened, the belt slackens and idles on a free-running, grease sealed, ball bearing.

One fixed flange of the V-belt sheave is an integrally attached part of the hub and the inner race of the sealed ball bearing belt idler. Four free-rolling steel balls ride in grooves in the hub and carry all turning and locking forces. Balls are carried forward by the sliding clutch sleeve or movable flange and drop into pockets at the ends of their grooves. Cam sleeve moves over clutch

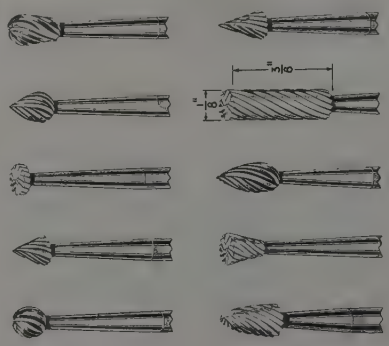


sleeve and locks the clutch against the balls in driving or driven position.

Clutches are suitable for application in connection with internal combustion engines, motors, tractors, etc. The four sizes made have 3¼ to 5 in. sheave diameter and ¾ and 1 in. shafts.

9. Shank Lab Mills

High speed 3/32-in. shank lab mills in ten shapes and six sizes for use in the manufacture of diesel injectors, aircraft parts, die castings, dies and molds, and other small, intricate parts are of-



fered by Severance Tool Industries Inc., 769 Iowa street, Saginaw, Mich. Mills, ground from the solid after hardening and mounted on shanks, are 1 5/8-in. overall length and are available with cutting head diameters from 1/16 to 5/16-in., in 1/32-in. steps.

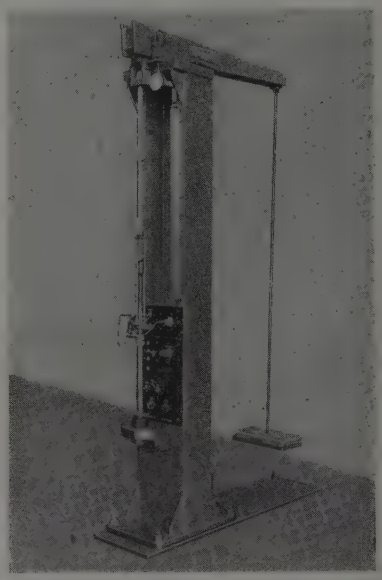
10. Drilling Rig

Designed for drilling to depths in excess of 20,000 ft, the J-2000 drilling rig announced by Emsco Derrick & Equipment Co., Los Angeles, is a 2000-hp unit which may be powered by internal combustion engine, steam engine or electric motor. Unit has air operated clutches on all drum and rotary drives.

11. Creep Tester

Creep testing machine for testing metals at elevated temperatures is offered by Baldwin Locomotive Works, Philadelphia 42. Of the lever arm type, it has a capacity of 12,000 lb or 60,000 psi on a 0.505-in. diameter specimen. Its accuracy is within 1 per cent of load.

Strain indication is by extensometer attached at pin holes at shoulders of specimen, and is read directly to 0.0000-



25-in. on a motor-driven revolution counter by means of a follow-up contact method. Extensometer operates to rupture point. Specimen is heated by a small furnace with coils wound with chomel wire. Maximum furnace temperature is 1600° F but other furnaces for 1800 and 2200° F may be supplied.

12. Geiger-Mueller Counter

Features and advantages of the all metal constructed Geiger-Muller counter tubes made by Geophysical Instrument Co., 1820 North Nash street, Arlington, Va., include resistance to breakage, an active diameter nearly equal to the overall outside diameter and lower intrinsic background count. When provided with the proper operating voltage and proper circuit, this tube will give a series of electrical impulses having a frequency proportionate to the intensity of the rays striking the tube.

Tubes may be used in gamma ray apparatus where space for the tube is at a premium, as well as in cosmic ray telescopes and other coincidence circuit arrangements. Operating voltage for the

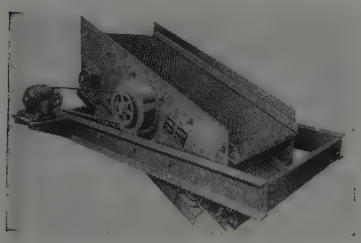
metal tubes in the vicinity of 1000 v and cosmic ray efficiency is better than 99 per cent. Tubes are made in sizes ranging from ½-in. diameter and ½-in. long to 3 in. diameter and 5 ft long.

13. Capacitors

Midget paper dielectric capacitors, introduced by Sprague Electric Co., North Adams, Mass., are small tubulars designed to operate at 85° C with ample humidity protection for normal uses. Known as types 68P and 69P, they feature side leads to allow wiring them across the sockets of miniature tubes, on the former type and conventional end leads on the latter.

14. Vibrating Screen

Economical and effective sizing of a large variety of materials is possible with the concentric action vibrating screen announced by Link-Belt Co., 307 North Michigan avenue, Chicago 1. Unit may be either an inclined floor



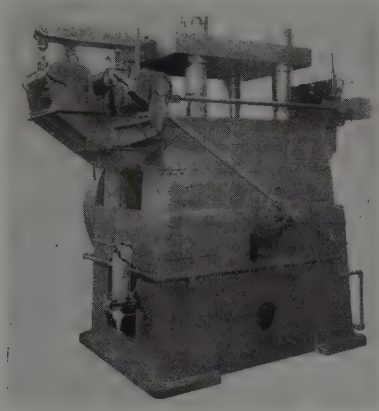
mounted or spring and cable suspended model with a balanced two-bearing vibrator mechanism which imparts a concentric or circular vibrating motion to all points of the screening surface.

Screen may be used for both medium and heavy-duty sizing as well as for scalping and dewatering or rinsing operations. It is made with double or triple decks and in sizes ranging from 3 x 8 ft to 6 x 14 ft. Single deck screens may be provided by removing the lower deck or the standard double deck unit.

15. Automatic Press

Available in sizes from 30 to 750 ton capacities, a line of automatic presses, made by Brandes Press Co., 6408 Euclid avenue, Cleveland 3, is designed for progressive die work. Presses feature rugged construction, large bed areas and operation at highest possible speed for blanking, forming and drawing operations. Crankshaft is located below the bed, working through a lower cross head and guided draw rods pulling the top platen down on the material evenly at four points.

All presses are equipped with electrically controlled, air operated friction disk clutch and brake and all moving parts are lubricated through a centralized lubrication system. Other features on the standard machine include long multiple V-ways in base for guiding lower cross heads and air counterbalanced reciprocating parts. No special foundation is required as no structural members

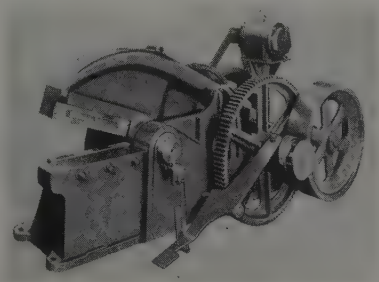


or operating parts are below the machine's base.

Press illustrated is of 175 ton capacity, equipped with double roll feed and scrap cutter. Back geared machines for deed drawing work are also made, these machines having a quick feeding arrangement so that a greater portion of the stroke may be utilized for the drawing operations.

16. Alligator Shears

Fully automatic alligator shears for use on accurate dimensional cutting in forge shops, steel warehouses, industrial plants, etc., are manufactured by Doel-



ger & Kirsten Corp., 3015 West Chambers street, Milwaukee, Wis. A new type of foot-operated clutch and brake mechanism permits the operator to feed the shear and adjust the cut as desired. Entire mechanism is simple, assuring accurate shearing under all conditions.

If continuous operation is desired the foot treadle may be latched down. Shears are available in seven sizes in a variety of styles to meet any requirement.

FOR MORE INFORMATION

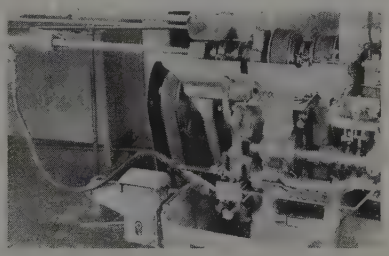
on products and equipment described in this section, fill in a card following page 158.

17. Aluminum Casters

An aluminum wheeled caster of high tensile srength for use in plants where explosive hazards exist is announced by Market Forge Co., Everett 49, Mass. Face of wheel is machined concentric with the axle and runs on roller bearings equipped with hardened inner races and high pressure Zerk fittings. Casters are available in both swivel and rigid types, with 4 x 2, 6 x 2 or 8 x 2 in. wheels.

18. Bar Feed Attachment

With power furnished by pump on the machine and only liquid required being the coolant, the liquid pressure bar feed attachment for Brown & Sharpe and single spindle Cleveland automatics, made by Hy-Level Screw Products Co., 2114 West Superior avenue, Cleveland 13, feeds stock directly into the collet. The device applies a uniform pressure



during the feed cycle only. Short feed-outs and recoil action of bar stock of stock are eliminated, as is blind groping to locate bare end in collet opening.

Feed attachment utilizes a packless piston which has no moving parts. The ceiling mounted unit minimizes noise. A feed tube long enough to carry a full length bar is inserted in the machine spindle and collet. This tube carries the piston which is adjustable for various bar feed lengths. Device is self-aligning and loaded from the left of the machine.

19. Stud, Rivet Driver

Steel plates that total as much as 1¼-in. may be riveted together or long threaded studs may be anchored in a concrete wall or floor with the "Drive-It," manufactured by Powder-Power Tool Corp., 1618 North Vancouver avenue, Portland 12, Ore. Deriving its power from a .38 caliber cartridge, the light weight tool will strike a blow equivalent to 25 tons with no recoil.

Tests have shown that studs driven into the average concrete wall will not pull out when loads in excess of 3500 lb are applied. Driver may be used

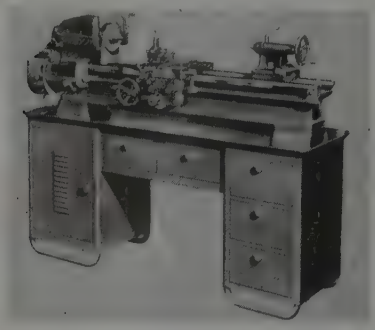
to punch holes in castings, forgings and plates for insertion of bolts or for fastening wood to metal or concrete. Various styles and sizes of rivets, punches and studs are available.

20. Protective Coatings

An anticorrosive co-polymer finish, P-5, is a series of coatings for the protection of metal, wood and concrete against corrosion from exposure to moisture, acids, alkalies and other elements. Developed by Watson-Standard Co., Pittsburgh 12, it is fast drying, nontoxic, free from objectionable odors. It dries by oxidation, has good thermal stability and does not oxidize or become brittle.

21. Lathe

"Zero precision" tapered roller bearings, incorporated into the model TRB-S-56 lathe, made by Sheldon Machine Co. Inc., 4258 North Knox avenue, Chicago 41, have necessitated a redesigned headstock, elimination of bearing caps and changing to a larger solid housing. So equipped, the 11 1/4-in. swing, 1 in. collet capacity lathe has exacting accuracy.



Four-speed v-belt is housed beneath drive, with double v-belts to spindle, all mounted on a heavy, well ribbed metal cabinet. Bed of lathe is 56 in. long and 35 in. between centers.

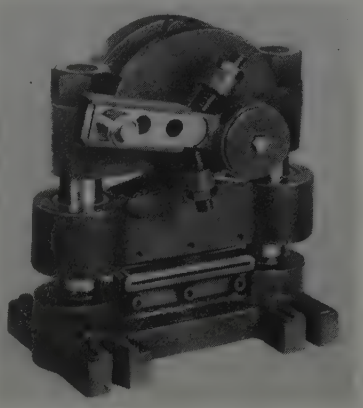
22. Induction Generator

Ready for operation immediately by plugging into any 120 v, 60 cycle, single-phase power supply outlet, the Ther-Monic model 43, 750 w bench type induction heating generator, made by Induction Heating Corp., 389 Lafayette street, New York 3, has a full load output of 43 Btu per minute. This is equivalent to approximately 750 w at a nominal operating frequency of 450 kc per sec.

The unit combines the power section and work applicator. Single or multi-turn coils may be made by shaping copper tubing or wire to the work piece. Controls provide for automatic or manual operation, including automatic reset timer, start and stop control buttons, on and off switch and plug connection for foot switch control of heating cycle. The unit is protected by a plate overload circuit breaker and an instantaneous line circuit breaker, either of which will automatically shut off the generator if improper line voltage or load conditions should arise.

23. Scrap Cutter

Ram driven, a compact scrap cutter which may be used on almost any punch press is announced by Haller Machine & Mfg. Co. Inc., 7940 Tireman avenue, Detroit 4. It will cut all stock to 4 in. wide and ⅜-in. thick.



Known as model D-611, the cutter measures 6½-in. wide, 9¼-in. deep and 10 in. high. It is mounted on the press bolster plate, is driven directly from the ram or die, and is adjustable for any length of ram stroke up to 6 in. Its high speed steel blades may be removed for sharpening.

24. Hand Truck

Featuring an all welded steel construction, rubber tired ball bearing wheels and a large nose plate to facilitate loading, a new hand truck offered by Sage Equipment Co., 110 Auburn avenue, Buffalo 13, weighs but 43 lb. It has comfortable grip handles of curved 3/4-in. pipe and curved or straight back eases handling of loads up to 500 lb. Truck is 19 1/2-in. wide at the top and 14 1/2-in. wide at the nose.

25. Air Powered Vise

An air powered vise with fast, continuous and regulated grip and jaws of design and movement patterned after standard machinists vises, is introduced by Van Products Co., Erie, Pa. Air regulator valve provides unlimited jaw pressures from 0 to 3 1/2 tons; it holds light, delicate work without injury, or heavy, unwieldy pieces.

Entirely operated by foot control, a slight toe pressure closes the jaws and heel pressure opens. Pedal locks in either position. Jaws are 4 1/2-in. wide, open to 7 in. and have a maximum stroke of 1 1/4-in. Recommended air pressures are from 15 to 150 psi.

Vise may be installed in any position to hold, form, punch, straighten, press, etc. A simple fixture holder for rigidly attaching dies, tools and fixtures and all types of jaw faces is available.

26. Hole Punching Units

Punching of mild steel up to 1/4-in. thick is possible with the type CJ hole punching units, made by Wales-Strippit Corp., North Tonawanda, N. Y., with punches as part of the units. Punches are not attached to ram; stripper springs strip the work from the punches and lifter springs return the punches and guides to the "up" position for unobstructed feeding of the work.

With punches and dies built into the holders, these two parts are always in perfect alignment. Units permit an unlimited number of straight line, scattered and staggered hole punching patterns of varying center-to-center distances. The same units may be set up on a mounting plate in a stamping press, a rail on a press brake or a T-slotted plate in a stamping press. Punching units are available in a variety of punch diameters and throat depths.

27. Ear Noise Reducer

An inexpensive means of excluding excessive noise from the ear while permitting speech and warning signals to be heard is provided by Ear Defenders, made by Mine Safety Appliances Co., Pittsburgh 8. Device is a tapered tube molded from a soft, nontoxic, elastomeric material with an inner septum for filtering harmful noises.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Steel Buyers Resigned to Early Increase in Prices

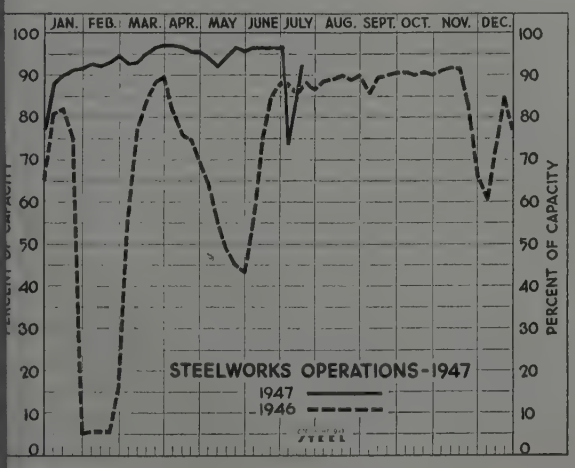
Extent of prospective advance uncertain. Some market observers expect average boost of $5, others closer to $3. Action unlikely until month-end at earliest. Scrap still heading upward. Lack of steel forces plant shutdowns

EXTENT to which steel prices will be increased still as uncertain last week. Comment in some market cir-les was that the overall raise would average out at bout $5 per ton, but a few market authorities advanced ie idea the increase may come out closer to $3 per on. In the circumstances it appeared any figures ad-anced prior to actual announcement by producing in-erests belonged in the realm of speculation. About all iat could be said with any degree of certainty was that price rise appeared to be in the making.

Indications are no industry-wide increase will be ef-ected prior to the end of this month at earliest. In-ependent steelmakers are likely to await action by the nited States Steel Corp. before moving, and the Steel orporation will not announce policy until its board of irectors meets July 29. Even that date may be out in iew of the statement attributed to Benjamin Fairless, resident, vacationing in Honolulu, that the corporation ill not advance prices until a "fair test" had been made the cost factors created by the coal wage agreement.

Whatever increase eventually is effected, it appears ertain that it will not be across-the-board. Some prod-cts will go up more than others, reports in the trade dicating $7 as the likely maximum rise on any single oduct.

President Truman's plea to delay price action pending orough digesting of the miners' wage increase was not elieved likely to alter the situation. As a matter of fact, few increases were effected last week. Two producers ised southern pig iron $3.50 a ton, while a small maker



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended July 19	Change	Same Week 1946	Same Week 1945
Pittsburgh	98.5	+13.5	98	86.5
Chicago	89	− 4.5	91	94
Eastern Pa.	94	+ 2	85	87
Youngstown	80	+25	87	90
Wheeling	83.5	+ 5.5	81.5	96.5
Cleveland	92	+14.5	87	86
Buffalo	88.5	None	88.5	88.5
Birmingham	99	None	99	95
New England	87	+ 4	85	86
Cincinnati	87	+ 3	77	96
St. Louis	82	− 2.5	54.5	70
Detroit	92	None	83	83
Estimated national rate	92.5	+ 6.5	88	90

Based on weekly steelmaking capacity of 1,749 928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

of light rails, rail reinforcing bars and merchant carbon bars upped prices $5 per ton. At the same time beehive coke was increased $2 to $3.

Steel consumers are resigned to a steel increase. Some of them say they welcome a price boost if it means a larger supply of steel. However, demand continues as pressing as ever with little relief in sight. Consumers continue on meager rations and plant shutdowns for brief periods pending receipt of steel shipments are common. For instance, General Motors is closing its passenger car plants for a week for lack of steel.

Scrap, the bad boy of the steel market, is acting up again. Prices at many points are headed upward with brokers bidding actively for scarce supplies. Significantly, little mill buying is reported, though the market at Pittsburgh is up $1 on a small mill purchase. Mill resistance to the higher open-market offerings is strengthened by receipt of substantial tonnage direct from consuming plants.

Steel operations have practically recovered from effects of the coal mining suspension, the national ingot rate last week rising 6½ points to 92.5 per cent of rated capacity. This is only 4 points under the June rate and only 4½ points under the postwar high. Advances were as follows: 25 points to 80 per cent in Youngstown, 14½ points to 92 per cent at Cleveland, 13½ points to 98.5 per cent at Pittsburgh, 5½ points to 83.5 per cent at Wheeling, 4 points to 87 per cent in New England, 3 points to 87 per cent in Cincinnati, and 2 points to 94 per cent in eastern Pennsylvania. The ingot rate eased 4½ points to 89 per cent at Chicago and 2½ points to 82 per cent at St. Louis.

While the semifinished steel composite price average held unchanged last week at $52.10, undertone of the market was strong with sales negotiated by smaller companies at levels above published prices. Finished steel price average held unchanged at $69.82 while the composite on steelmaking pig iron was higher at $32.92 compared with the previous average of $32.49. Steelmaking scrap price average moved higher to $36.08 from $35.50.

COMPOSITE MARKET AVERAGES

	July 19	July 12	July 5	One Month Ago June, 1947	Three Months Ago Apr. 1947	One Year Ago July, 1946	Five Years Ago July, 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$69.82	$64.45	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	52.10	40.60	36.00
Steelmaking Pig Iron	32.92	32.49	32.49	32.49	32.49	27.50	23.00
Steelmaking Scrap	36.08	35.50	35.08	32.48	33.94	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	July 19, 1947	June, 1947	Apr., 1947	July, 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.60c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.98	2.86
Steel bars, Chicago	2.60	2.60	2.60	2.50
Shapes, Pittsburgh	2.50	2.50	2.50	2.35
Shapes, Philadelphia	2.64	2.64	2.64	2.48
Shapes, Chicago	2.50	2.50	2.50	2.35
Plates, Pittsburgh	2.65	2.65	2.65	2.50
Plates, Philadelphia	2.85	2.85	2.85	2.558
Plates, Chicago	2.65	2.65	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	3.55	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	3.55	†4.05
Strip, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.45
Strip, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.425	3.05
Wire nails, Pittsburgh	4.125	4.125	4.125	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	42.00	39.00
Rerolling billets, Pittsburgh	42.00	42.00	42.00	39.00
Wire rods 5/16 to 1/4-inch, Pitts.	2.55c	2.55c	2.55c	‡2.30c

‡ Base, No. 5 to 5/16-in.

Pig Iron

	July 19, 1947	June, 1947	Apr., 1947	July, 1946
Bessemer, del. Pittsburgh	$34.83	$34.83	$34.83	$29.77
Basic, Valley	33.00	33.00	33.00	28.00
Basic, eastern del. Philadelphia	35.72	35.52	35.52	27.93
No. 2 fdry., del. Pgh. N. & S. sides	34.33	34.33	34.33	29.27
No. 2 fdry., del. Philadelphia	36.54	36.02	36.02	28.43
No. 2 foundry, Chicago	33.00	33.00	33.00	28.50
Southern No. 2 Birmingham	33.38	29.88	29.28	22.88
Southern No. 2, del. Cincinnati	38.25	34.75	34.75	26.94
Malleable, Valley	33.50	33.50	33.50	28.50
Malleable, Chicago	33.50	33.50	33.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	43.00	40.50	40.50	33.00
Gray forge, del. McKees Rocks, Pa.	33.66	33.66	33.66	28.61
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$36.00	$32.44	$35.81	$20.00
Heavy melt. steel, No. 2, E. Pa.	38.50	33.38	33.25	18.75
Heavy melt. steel, Chicago	33.75	30.75	32.75	18.75
Rails for rerolling, Chicago	41.50	38.75	38.25	22.25
No. 1 cast, Chicago	40.50	39.50	42.50	20.00

Coke

Connellsville, beehive furnace	$12.00	$9.56	$9.06	$8.75
Connellsville, beehive foundry	14.50	10.75	10.375	9.50
Chicago, oven foundry, del.	17.10	16.10	16.10	15.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown. **Alloy Steel Ingots:** Pittsburgh, Canton, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42, sales by smaller interests on negotiated basis. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich, $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61, del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown. $53; sales by smaller interests on negotiated basis.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.35c per lb.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5/16 to 1/4-in., inclusive $2.55-2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c; San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: 2.60c-3.45c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-3.30c.

Iron Bars: Single refined, Pittsburgh 6.15c-†6.70c; double refined, 7.00-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c

† Hand puddled

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c; Los Angeles (base, del.), 3.24c; San Francisco, (base, del.), 3.245c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c; Los Angeles (base, del.), 4.32c; San Francisco (base, del.), 4.325c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 3.65c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc), corrugated 10 cents extra; Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.15c; copper-iron or pure iron, 4.50c. Granite City base prices 10 points higher. Los Angeles (base, del.), 4.94c; San Francisco (base, del.), 4.945c.

Aluminized Sheets, No. 20: Hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c. (Empire Steel Corp., 4.00c, Pittsburgh.)

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.20c; Kokomo, Ind., 4.30c. Armature: Pittsburgh, Chicago, Gary, 4.50c; Granite City, Ill., Kokomo, Ind., 4.60c. Electrical: Pittsburgh, Chicago, Gary, 5.00c; Granite City, Kokomo, 5.10c. Motor: Pittsburgh, Chicago, Gary, 5.75c; Granite City, 5.85c. Dynamo: Pittsburgh, 6.45c; Granite City, 6.55c. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c.

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del. 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; over 0.80 to 1.00, 6.80c; over 1.00, 9.10c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c; San Francisco and Los Angeles, del., 3.29c-3.46c. (Central Iron & Steel Co., Harrisburg, Pa., 3.85c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont, equivalent; Worth Steel Co., Claymont, Del., 2.90c mills.)

Floor Plates: Pittsburgh, Chicago, 3.90c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; New York, del., 2.70c; Phila., del., 2.64c; Geneva, Utah (base, del), 2.675c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c. (Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)

Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer.....*$3.30–$3.55
Spring (except Birmingham)..... **$4.25

Wire Products to Trade

Nails and Staples

Standard and cement-coated.....†$3.75–$4.50
Galvanized .....‡$3.75–$4.50

Wire, Merchant Quality

Annealed (to 8 base)..... $3.95
Galvanized (to 8 base)..... $4.40

(Fob Pittsburgh, Chicago, Birmingham, per base column)

Woven fence, 15 gage and heavier.... ††84
Barbed wire, 80-rod spool..... ††94
Barbless wire, twisted..... 94
Fence posts (no clamps)..... ††90
Bale ties, single loop..... ††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.

** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.05, Cleveland $3.85, base. San Francisco (base, del.) $4.83.

‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.

§ Worcester $4.05, annealed; $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.

†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), Williamsport, Pa., $3.45, Pittsburgh, $2.85.

Relaying, 60 lb and over fob warehouse $49-$51 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

Steel			Iron		
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	48	23	¼	— 2	+20
¼ & ⅜	51	30½	⅜	—11½	+10
½	55½	41	½	—17	+ 2
¾	58½	45	¾	—22½	— 1½
1-3	60½	47½	1	—23	— 2
			1¼	— 1	+20
			1½	7	+13
			2	—14½	+ 5½
			2½-3½	—17	+ 1½
			4	21	— 4
			4½-8	—19	+2½
			9-12	—10	+ 7

Lap Weld

Steel			Iron		
In.	Blk.	Gal.	In.	Blk.	Gal.
2	53	39½	1¼	— 1	+20
2½-3	56	42½	1½	7	+13
3½-6	58	44½	2	—14½	+ 5½
*8	58	42½	2½-3½	—17	+ 1½
*10	57½	42	4	21	— 4
*12	56½	41	4½-8	—19	+2½
			9-12	—10	+ 7

* Not T. & C.

Seamless
Steel

In.	Blk.	Gal.	In.	Blk.	Gal.
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2½"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2¾"	12	21.80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3¼"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.06	33.64
4"	10	35.82	42.55	34.78	41.68
4½"	9	47.48	56.42	....	....
5"	9	54.96	65.30	....	....
6"	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length 48 off
⅝ and ⅝ x 6-in. and shorter..... 50 off
Larger diameter; longer than 6 in..... 47 off

Tire bolts ..... 38 off
Step bolts ..... 46 off
Plow bolts ..... 57 off
Lag bolts
¼ in. up to 1 in., 6 in. and shorter.. 50 off
¼ in. up to 1 in., longer than 6 in... 48 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅛-in. and smaller	51 off	....
¼-in. and smaller	....	50 off
½-in.-1-in.	48 off	....
⅝-in.-1-in.	....	49 off
1⅛-in.-1½-in.	46 off	47 off
1⅝-in. and larger	....	40 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in. smaller (10-20 bright)..... 56 off
Upset (10-35 heat treated)
⅝ x 6 ..... 51 off
¾, ⅞, & 1 x 6 ..... 47 off

Square Head Set Screws

Upset 1-in. and smaller ..... 61 off
Headless, ¼-in. and larger ..... 46 off
No. 10 and smaller ..... 56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural 5.25c
Lebanon, Pa. 5.40c
⅞-in. and under ..... 55-5 off
Lebanon, Pa. .....55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per bbl; reg. carbon 16.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	74.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	62.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45 50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
*501	9.00	13.00	17.50	13.00	18 50
*502	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

PIG IRON

Prices per gross ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Philadelphia, del.	....	35.72	....	....
Birdsboro, Pa., base	40 50	40.00	41.50	41.00
Birmingham, base	33.38	32.88	....	....
Baltimore, del.	39.78	....	....	....
Chicago, del.	37.62	....	....	....
Cincinnati, del.	38.25	....	37.75	....
Newark, N. J., del.	39.46	....	....	....
Philadelphia, del.	38.63	....	....	....
St. Louis, del.	37.37	....	36.87	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	45.00	....	....	45.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†**Neville Island, Pa., base**	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. Sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Seattle, Tacoma, Wash., del.	38.60	....	....	....
Portland, Oreg., del.	38.60	....	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	....	36.50	36.00
Philadelphia, del.	36.54	....	37.54	37.04
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base).....$42.50
6.51-7.00..$43.50 9.01- 9.50. 48.50
7.01-7.50.. 44.50 9.51-10.00. 49.50
7.51-8.00.. 45.50 10.01-10.50. 50.50
8.01-8.50.. 46.50 10.51-11.00. 51.50
8.51-9.00.. 47.50 11.01-11.50. 52.50
Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever basis is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $61.75, Jackson, O.; $65, Niagara Falls; $66, piglets, $64, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$43.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $39; Birdsboro, Pa., $45, base; Philadelphia, $41.22, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	$11.50-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

* Operators of hand-drawn ovens using trucked coal, $10.10-$11.10.

Oven Foundry Coke

Kearney, N. J., ovens	$15.35
Chicago, outside del.	16.10
Chicago, del.	17.10
Terre Haute, del.	15.60
Milwaukee, ovens	16.85
New England, del.	17.25
Birmingham, Del.	15.00
Indianapolis, ovens	14.50
Cincinnati, del.	16.50
Ironton, O., ovens	14.50
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens	15.50
Swedeland, Pa., ovens	15.50
Portsmouth, O., ovens	14.00
Fairmont, W. Va., ovens	13.75
Pittsburgh, del.	15.61

Coal Chemicals

Spot, gal, freight allowed east of Omaha. Effective as of Apr. 1, 1947

Pure and 90% benzol	19.00c
Toluol, two degrees	23.00c
Industrial xylol	23.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl. to jobbers, "house-hold use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50–6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$32–$34

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$38.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH— LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.85	3.85	3.85	3.85	3.85	3.85	...	...	...
Cold-Rolled	4.75	4.75	4.75	4.75	...	4.75	...	...	...
Galvanized	5.40	....	....	....	...	.....	...	...	...
Strip, Hot-Rolled	3.85	3.85	3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes	4.00	4.00	4.00	4.00	...	4.00	...	4.00	4.00

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. °10G	Gal. °24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy (§4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (City)	4.50	5.67[4]	5.22[4]	5.55[4]	6.80[4]	4.65	6.36	4.62	5.22	7.12	4.47	4.70	6.42
††New York (city)	4.42	5.72	5.42[8]	5.47[5]	...	4.67	....	4.67	5.17	8.42[12]	4.42	4.82	6.40
New York (country)	4.32	5.57	5.27[8]	5.37[5]	....	4.52	....	4.52	....	....	4.27	4.67	6.25
Philadelphia (city)	4.34	5.73[9]	5.33[9]	5.29[5]	6.54[5]	4.43	5.28	4.48	5.13	6.87	4.22	4.44	5.93
Philadelphia (country)	4.24	5.63[9]	5.23[9]	5.19[5]	6.44[5]	4.33	5.18	4.38	....	6.60	4.12	4.34	5.83
Baltimore (city)	3.99†	5.50[8]‡	5.20[6]†	5.14[5]	6.39[5]	4.40	....	4.45	5.10	....	4.34	4.39	5.90
Baltimore (country)	3.89†	5.40[8]‡	5.10[6]†	....	....	....	....	....	....	....	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[5]	6.43[5]	4.65	....	4.70	5.60[11]	....	4.60	4.65	6.60
Norfolk, Va.	4.35	....	....	....	....	....	....	4.75	5.50	....	4.50	4.50	6.25
Memphis, Tenn. (city)	4.47[20]	....	5.53[20]‡	5.97[5]	....	4.72[20]	....	4.67[20]	5.78	....	4.67[20]	4.92[20]	6.58[20]
Memphis, Tenn. (country)	4.37[20]	....	5.43[20]‡	5.87[5]	....	4.62[20]	....	4.57[20]	5.68	....	4.57[20]	4.82[20]	6.48[20]
Buffalo (city)	4.15	....	4.85[6]	5.35[5]	....	4.30	5.25	4.10	4.75	....	4.10	4.55	5.90
Buffalo (country)	4.00	....	4.70[6]	4.95[5]	....	3.90	4.85	3.95	4.60	6.60	3.95	4.10	5.45
Pittsburgh (city)	3.95†	....	4.75[8]†	5.10[5]	6.35[5]	4.05	5.00	4.10	4.75	6.60	4.10	4.25	5.60
Pittsburgh (country)	3.80†	....	4.60[8]†	4.95[5]	6.20[5]	3.90	4.85	3.95	4.60	6.60	3.95	4.10	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	....	4.218	4.488	5.178
Youngstown, O. (country)	....	....	....	4.95	6.20	3.90	....	....	....	....	....	....	....
Detroit	4.05	5.30	4.85†	5.42	6.67	4.34	5.24	4.20	4.87[12]	7.01	4.42	4.49	5.92
Cleveland (city)	4.15	5.15[8]	4.85[8]	5.238[5]	6.488[5]	4.188	5.10	4.10	4.75	6.858	4.311	4.25	5.961
Cleveland (country)	4.00	5.00[8]	4.70[8]	....	....	3.90	4.95	3.95	4.60	....	....	4.10	....
Cincinnati	4.016	4.816[8]	....	5.166[5]	6.416[5]	4.394	....	4.403	5.053	....	4.444	4.553	5.944
Chicago (city)	4.15	5.15[8]	4.85[8]	5.10[5]	6.35[5]	4.05	5.10	4.10	4.75	6.60[12]	4.10	4.30	5.75
Chicago (country)	4.00	5.00[8]	4.70[8]	4.95[5]	6.20[5]	3.90	4.95	3.95	4.60	6.60[12]	3.95	4.15	5.60
Milwaukee	4.299	5.299[8]	4.999[8]	5.249[5]	6.499[5]	4.199	5.249	4.249	4.899	6.899	4.249	4.449	5.899
St. Paul, Minneapolis	4.284[13]	....	5.084[8]†	5.434[5]	6.684[5]	4.384[12]	....	4.434[13]	5.476[11]	7.084[11]	4.434[13]	4.584[13]	6.084[13]
Indianapolis	4.04	....	4.84[8]	5.29[5]	6.54[5]	4.24	....	4.36††	5.26	....	4.36	4.61	6.01
St. Louis	4.699	....	4.899[9]†	5.424[5]	6.674[5]	4.199	....	4.249	5.074[12]	7.074	4.249	3.999	5.899
Birmingham (city)	4.15[20]	....	....	5.25[5]	....	4.15[20]	....	4.15[20]	5.58	....	4.10	4.35	6.56
Birmingham (country)	4.00[20]	....	....	5.10[5]	....	4.00[20]	....	3.95[20]	....	....	3.95	4.20	....
New Orleans	4.68[20]°°°	....	5.94[8]	....	....	4.88[20]	....	4.83[20]°°°	5.94[21]	....	4.73[20]°°	5.03[20]	6.99[20]
Houston, Tex.	6.00[1]	....	....	6.00	....	6.00[1]	....	5.35[1]	....	6.35	5.85	5.85	6.40
Omaha, Nebr.	4.968	....	....	5.918[5]	7.168[5]	4.868	....	4.918	5.568[11]	....	4.918	5.068	6.568
Los Angeles	5.35	....	7.00[8]	....	7.45[5]	5.65	8.35	5.10	6.90[19]	9.35	5.20	5.10	7.20
San Francisco	4.90[21]	....	6.30[5]	....	7.35[5]	5.20[14]	8.35[14]	4.75[14]	°°°	9.35[16]	4.90[14]	5.00[14]	6.80[14]
Seattle and Tacoma, Wash.	5.00[17]	....	6.75[5]	6.30[5]	....	5.30[17]	....	5.00[17]	7.10[19]	8.50[13]	4.95[17]	5.15[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]—1500 to 39,999; [20]—400 to 3999 pounds; [21]—400 lb and over.

° Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; °° add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; °°° rounds under ⅝ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., $44, Pittsburgh, $48. 16% to 19% Mn, Pittsburgh, $47.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie - Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn). Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.27; contract, $2.25; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High - Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots. **S. M. Ferrochrome, high carbon:** (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched 0.25c higher. **Chromium Metal:** 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l., 14.10c; 2000 lb to c.l. 15.60c; central, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more; Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Price per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

OMSZ Alloys 4 & 5: (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western.

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Z 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed

Tungsten Metal Powder: Spot, not less than 98.8%, $2.90, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Trading in Copper Resumed on Exchange

"Free" market in zinc will return this week . . British Ministry of Supply cuts copper price

NEW YORK—Ministry of Supply announced last week that the official maximum price of electrolytic copper to home consumers has been reduced £5 per ton to £132, delivered buyer's works. Similar price adjustments were made in all other descriptions of copper, except black hot-rolled copper wire rods which were reduced £4 to £138 per ton. At the rate of $4.02½ for Sterling, the new price for electrolytic copper is equal to 23.72c a pound in U. S. currency, compared with the previously prevailing equivalent of 24.62c. Reduction in prices reflects lower prices at which the Ministry is buying copper overseas.

The Ministry of Supply announced also that it has removed restrictions on forward buying by consumers of copper, tin, lead and zinc against actual orders. Whereas previously buyers' forward purchases were limited to six months, they now may go farther into the future, if desired. Issuance of licenses will no longer be limited by the rate of consumption, stock and forward purchases. The only guarantee that applicants will have to give in the future is that their application is against orders for their products and that full allowance has been made for scrap intake.

Trading was resumed on the floor of the Commodity Exchange here last Wednesday in copper futures and will be resumed in zinc futures on Tuesday of this week.

COPPER—Initial trade, first in a "free" copper market since July 22, 1941, was a contract unit of 50,000 pounds for September delivery at 19.20c a pound. The producers' market held unchanged at 21.50c, Connecticut Valley, for electrolytic.

Crude copper production declined rather sharply in June to 81,854 tons compared with 91,203 tons in May, a drop of 9340 tons. Refinery output also dropped sharply to 98,758 tons, or 9726 tons under the May total.

Deliveries of copper to consumers in June totaled 116,652 tons, or only about 1400 tons less than in the previous month. Stocks at the refineries declined 7351 tons to a total of 76,629 tons at the end of June.

Reflecting the sharply reduced government-owned copper stockpile, allocations to American users from this surplus totaled only 7329 tons last month, compared with 11,195 tons in May and 23,089 tons in April.

Mufulira Copper Mines Ltd., one of the big African producers in Northern Rhodesia, announced last week that the mine and concentrator has been closed for one week due to a continued shortage of coal. On July 3, Mufulira closed the smelter for an indefinite period, probably for one month.

LEAD—Pressure for lead has eased slightly, due chiefly to a seasonal lull brought about by mass vacations at many consuming plants. Supplies remain tight, however, with some sellers booked up solidly for August shipment and others reserving bulk of tonnage for regular customers.

Mine production of lead dropped 3 per cent in May, indicating a somewhat higher decline in the average daily rate of output, according to the Bureau of Mines. Lowered production rates in all producing areas contributed to the decline. Total production came to 30,852 tons in May compared with 31,658 tons in April.

Operations in the secondary lead industry during 1946 reached a level second only to the record year 1941, with 392,787 short tons of lead valued at $65,988,216 being recovered from scrap, compared with 363,039 tons valued at $46,468,992 recovered in 1945, according to the Bureau of Mines. Secondary recovery thus exceeded the production of refined primary lead from domestic ores and base bullion for the second year in succession and the domestic mine production of lead for the first time, and did much to alleviate the shortage caused by low domestic production and imports of primary lead.

ZINC—Fresh inquiry for zinc was light last week, due chiefly to the fact that many consuming plants are closed for vacations. Prices held steady, however, at 10.50c, East St. Louis, for prime western. Inquiry in the export market was active with prices unchanged at 10.00c, fas Gulf Ports for prime western.

Mine ouput of zinc in May remained at virtually the high level of April, having increased 1 per cent while showing a slight decline in average daily rate of production, according to the Bureau of Mines. Zinc and zinc-lead mines in the Central States were said to be running generally at capacity rates in terms of crude ore tonnages because of the possibility the premium price plan would not be extended beyond June 30. Total production in May came to 57,181 tons of recoverable zinc compared with 56,827 tons in April.

TIN—Import and allocation controls on tin and antimony and export controls on more than 300 commodities until Feb. 29, 1948, have been extended by the government. Shipments of Straits tin from Singapore and Penang amounted to 2880 tons in June, bringing the half-year total to 11,687 tons. Shipments to the United States have appeared for the first time as 2250 tons out of the 2880 tons shipped last month and were consigned against purchases made by the Reconstruction Finance Corp. from the British Ministry of Supply.

SECONDARY COPPER, BRASS—Recovery of secondary copper from scrap totaled 803,546 tons valued at $231,421,248 in 1946, a decline of 20 per cent from the 1,006,516 tons valued at $237,537,776 recovered in 1945, according to the Bureau of Mines.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 18.00c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 22.00c; No. 1 yellow (No. 405) 14.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 13.75c; No. 12 foundry alloy (No. 2 grade) 13.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 12.50c; grade 3 (90-92%) 11.75c; grade 4 (85-90%) 11.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 36.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $84-$87 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb

Beryllium-Copper: 3.75-4.25% Be, $17 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg); $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 64.75c, per ounce.

Platinum: $53-$56 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.44c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electrodeposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb. 95.75c; less than 200 lb, 96.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb. 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.00, No. 2 copper 15.50, light copper 14.00, composition red brass 12.75, auto radiators 9.50, heavy yellow brass 8.75, brass pipe 9.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 17.00-17.50c, No. 2 copper, 15.50-16.00, light copper, 14.50-15.00, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 13.62½.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 15.00-15.50, No. 2 13.75-14.00, light copper 12.50-13.00; No. 1 composition red brass 11.00-11.50, No. 1 composition turnings 10.00-10.50, mixed brass turnings 5.50-6.00, new brass clippings 12.00-12.50, No. 1 brass rod turnings 10.50-11.00, light brass 4.75-5.00, heavy yellow brass 6.50-7.00, new brass rod ends 11.00-11.50, auto radiators, unsweated 8.50-8.75, cocks and faucets 8.50-9.00, brass pipe 8.25-8.50.

Lead: Heavy lead 10.50-11.00, battery plates 6.00-6.25, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 11.00-11.50, solder joints 15.50-16.00.

Zinc: Old zinc 5.00-5.50, new die cast scrap 3.75-4.00, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 7.50-8.00, old sheets 5.00-5.50, crankcase 4.00-4.50, borings and turnings 2.00, pistons, free of struts, 4.00-4.50.

Nickel: Anodes 18.50-19.00, turnings 15.50-16.50, rod ends 18.00-19.00.

Monel: Clippings 13.00-14.00, turnings 7.50-8.00, old sheet 11.00-12.00, rods 11.50-12.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	36.00
Nos. 1, 2 & 3 Bundles	36.00
Machine Shop Turnings	30.50-31.00
Mixed Borings, Turnings	30.50-31.00
Short Shovel Turnings	32.50-33.00
Cast Iron Borings	31.50-32.00
Bar Crops and Plate	39.00-40.00
Low Phos. Cast Steel	39.00-40.00
Punchings & Plate Scrap	39.00-40.00
Cut Structurals	39.00-40.00
Elec. Furnace Bundles	39.00-40.00
Heavy Turnings	31.00-31.50
No. 1 Chemical Borings	31.00-32.00

Cast Iron Grades

No. 1 Cupola	40.00-41.00
Charging Box Cast	35.00-35.50
Heavy Breakable Cast	34.00-34.50
Stove Plate	37.50-38.00
Unstripped Motor Blocks	37.50-38.00
Malleable	48.00-49.00
Brake Shoes	35.00-36.00
Clean Auto Cast	40.00-41.00
No. 1 Wheels	42.00-42.50
Burnt Cast	35.00-36.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	38.50-39.00
R.R. Malleable	48.00-49.00
Axles	40.00-41.00
Rails, Rerolling	37.00-37.50
Rails, Random Lengths	39.00-39.50
Rails, 3 ft and under	40.50-41.00
Rails, 18 in. and under	42.00-42.50
Railroad Specialties	44.00-44.50
Uncut Tires	39.00-40.00
Angles, Splice Bars	39.00-40.00

* Brokers buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 2 Heavy Melt. Steel	37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
Machine Shop Turnings	30.00-30.50
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings	31.50-32.00
Cast Iron Borings	31.50-32.00
Bar Crops and Plate	40.00-40.50
Cast Steel	45.00-46.00
Punchings & Plate Scrap	40.00-40.50
Elec. Furnace Bundles	39.00-39.50
Heavy Turnings	37.00-37.50
Alloy Free Turnings	31.00-31.50
Cut Structurals	40.00-40.50

Cast Iron Grades

No. 1 Cupola	46.00-48.00
Charging Box Cast	42.00-44.00
Stove Plate	40.00-42.00
Heavy Breakable Cast	40.00-42.00
Unstripped Motor Blocks	43.00-44.00
Malleable	56.00-57.00
Brake Shoes	42.00
Clean Auto Cast	47.00
No. 1 Wheels	45.00
Burnt Cast	40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	39.00-39.50
R.R. Malleable	56.00-57.00
Rails, Rerolling	44.00-45.00
Rails, Random Lengths	44.00-45.00
Rails, 3 ft and under	46.00-47.00
Railroad Specialties	46.00
Uncut Tires	44.00
Angles, Splice Bars	47.00

VALLEY

No. 1 Heavy Melt. Steel	$35.00-38.00
No. 2 Heavy Melt. Steel	35.00-38.00
No. 1 Bundles	35.00-38.00
Machine Shop Turnings	31.00-31.50
Short Shovel Turnings	31.50-32.00
Cast Iron Borings	31.50-32.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	39.00-39.50

MANSFIELD

No. 1 Heavy Melt. Steel	$33.00-34.50
Machine Shop Turnings	31.00-31.50
Short Shovel Turnings	31.00-31.50

CINCINNATI

No. 1 Heavy Melt. Steel	$34.00
No. 2 Heavy Melt. Steel	34.00
No. 1 Busheling	34.00
No. 1 Bundles	34.00
No. 2 Bundles	34.00
Machine Shop Turnings	28.00
Mixed Borings, Turnings	27.00
Short Shovel Turnings	30.00
Cast Iron Borings	29.00

Cast Iron Grades

No. 1 Cupola Cast	45.00
Charging Box Cast	37.00
Heavy Breakable Cast	38.50
Stove Plate	35.00
Unstripped Motor Blocks	37.00
Brake Shoes	34.00
Clean Auto Cast	44.00
Drop Broken Cast	47.00

Railroad Scrap

No. 1 R.R. Heavy Melt	38.00
R.R. Malleable	52.00
Rails, Rerolling	42.00
Rails, Random Lengths	42.00
Rails, 18 in. and under	47.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$31.00-31.50
No. 1 Busheling	31.00-31.50
Nos. 1 & 2 Bundles	31.00-31.50
No. 3 Bundles	31.00-31.50
Machine Shop Turnings	26.50-27.00
Mixed Borings, Turnings	26.50-27.00
Short Shovel Turnings	28.50-29.00
Cast Iron Borings	28.50-29.00
Punchings & Plate Scrap	38.00-38.50

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
Heavy Breakable Cast	26.00-27.00
Clean Auto Cast	34.00-35.00

BUFFALO

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Busheling	38.00
Nos. 1 & 2 Bundles	38.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Cast Iron Borings	29.00-30.00
Short Shovel Turnings	30.00-31.00
Punchings & Plate Scrap	40.00-41.00
Elec. Furnace Bundles	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-38.00
Heavy Breakable Cast	33.00-34.00
Malleable	38.00-39.00
No. 1 Wheels	35.00-36.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$38.00-39.00
No. 2 Heavy Melt. Steel	38.00-39.00
No. 1 Busheling	38.00-39.00
No. 1 Bundles	38.00-39.00
No. 2 Bundles	38.00-39.00
No. 3 Bundles	34.00-35.00
Machine Shop Turnings	29.50-30.00
Mixed Borings, Turnings	27.50-28.00
Short Shovel Turnings	31.00-32.00
Bar Crops and Plate	41.50-42.50
Punchings & Plate Scrap	41.50-42.50
Cut Structurals	41.00-41.50
Elec. Furnace Bundles	39.50-40.50
Heavy Turnings	37.50-38.50
No. 1 Chemical Borings	32.00-33.00

Cast Iron Grades

No. 1 Cupola Cast	46.50-47.50
Charging Box Cast	47.00-48.00
Heavy Breakable Cast	45.50-46.50
Unstripped Motor Blocks	41.00-41.50
Malleable	54.00-55.00
Clean Auto Cast	46.00-47.00
No. 1 Wheels	47.00-47.50

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00
No. 2 Heavy Melt. Steel	35.00
No. 1 Busheling	35.00
Nos. 1 & 2 Bundles	35.00
No. 3 Bundles	30.00
Machine Shop Turnings	25.00-25.50
Mixed Borings, Turnings	25.00-25.50
Short Shovel Turnings	27.00-27.50
Punchings & Plate Scrap	37.00-37.50
Cut Structurals	37.00-37.50
Elec. Furnace Bundles	36.00-36.50
No. 1 Chemical Borings	24.50-25.00

Cast Iron Grades

No. 1 Cupola Cast	41.50-42.00
Charging Box Cast	41.50-42.00
Heavy Breakable	41.50-42.00
Unstripped Motor Blocks	35.00-36.00
Malleable	48.00-49.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$32.00-32.50
No. 2 Heavy Melt. Steel	32.00-32.50
Nos. 1 & 2 Bundles	32.00-32.50
No. 1 Busheling	32.00-32.50
Machine Shop Turnings	26.00-26.50
Mixed Borings, Turnings	24.50-25.00
Short Shovel Turnings	28.00-28.50
Bar Crops and Plate	34.00-35.00
Punchings & Plate Scrap	34.00-35.00
Chemical Borings	26.00-27.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-42.00
Charging Box Cast	38.00
Heavy Breakable Cast	37.00-38.00
Stove Plate	36.00-37.00
Unstripped Motor Blocks	31.00-32.00
Clean Auto Cast	40.00

CHICAGO

No. 1 Heavy Melt. Steel	$33.50-34.00
No. 2 Heavy Melt. Steel	32.50-33.00
Nos. 1 & 2 Bundles	32.50-33.00
No. 3 Bundles	30.50-31.00
Machine Shop Turnings	30.00-31.00
Mixed Borings, Turnings	30.00-31.00
Short Shovel Turnings	28.50-29.00
Cast Iron Borings	29.00-30.00
Bar Crops and Plate	36.00-37.00
Cast Steel	36.00-37.00
Punchings	36.00-37.00
Elec. Furnace Bundles	34.50-35.50
Heavy Turnings	33.00-33.50
Cut Structurals	35.50-36.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-42.00
Malleable	39.00-42.00
Clean Auto Cast	39.00-42.00
No. 1 Wheels	40.00-42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	35.00-36.00
Rails, Rerolling	41.00-42.00
Rails, Random Lengths	40.00-41.00
Rails, 3 ft. and under	41.00-42.00
Rails, 18 in. and under	42.00-43.00
Railroad Specialties	41.00-42.00
Angles, Splice Bars	41.00-42.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$32.50-33.50
No. 2 Heavy Melt. Steel	30.00-31.00
Machine Shop Turnings	24.00-26.00
Short Shovel Turnings	27.00-28.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	38.00-40.00
Charging Box Cast	32.00-34.00
Heavy Breakable Cast	30.00-31.00
Stove Plate	29.00-32.00
Brake Shoes	36.00-38.00
Clean Auto Cast	39.00-40.00
No. 1 Wheels	38.00-40.00
Burnt Cast	29.00-32.00

Railroad Scrap

R.R. Malleable	50.00-52.00
Rails, Rerolling	37.50-40.00
Rails, Random Lengths	35.00-37.00
Rails, 3 ft and under	40.00-42.00
Uncut Tires	34.50-35.50
Angles, Splice Bars	36.00-38.00

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No. 2 Heavy Melt. Steel	33.00
No. 1 Busheling	33.00
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No. 3 Bundles	31.00
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Short Shovel Turnings	24.00
Cast Iron Borings	23.00
Bar Crops and Plate	36.00
Cut Structurals	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	41.00
Stove Plate	39.00
No. 1 Wheels	36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	35.00
R.R. Malleable	42.50
Axles, Steel	37.50
Rails, Rerolling	39.00
Rails, Random Length	37.00
Rails, 3 ft and under	39.00
Angles and Splice Bars	39.00

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No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths	21.00
Uncut Tires	28.00

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	27.50
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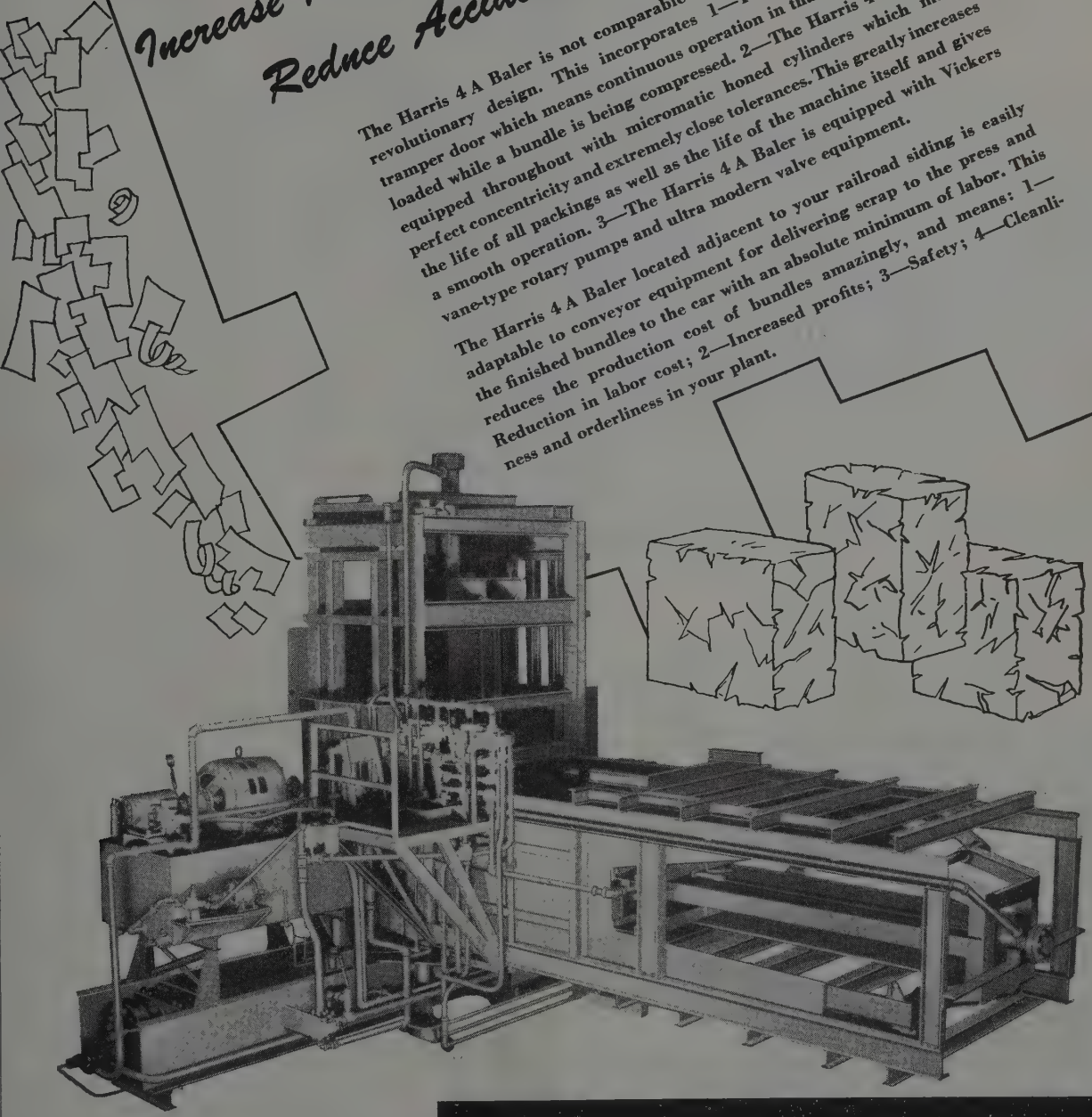

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Sheets, Strip . . .

No improvement in fourth quarter supply indicated . . Buying is more realistic

Sheet Prices, Page 162

Boston — Users of sheets and other steel products are trimming inventories of the latter to balance the volume of flat-rolled in sight over the remainder of the year. Convinced that no increase of note in sheet volume may be expected in the near future, more consumers see no point in throwing inventories out of further balance by heavier purchases of more available materials now. Sheet supply, in other words, is the key link in the buying chain of more consumers. Those utilizing sheets only in the production of goods are gearing schedules more realistically on the availability of that commodity. The purchasing policy of many is more closely in tune with flat-rolled prospects in striving for inventory balance.

Without exception more users would buy more if available, but most admit nothing beyond allocations will be forthcoming for weeks. There are minor signs in narrow cold strip portending a slackening in new orders while hot strip is better balanced for re-rolling, although the mild wave of deferments is receding. Cold strip inventories are higher in some instances; largest consumer of shank steel is crying "uncle" on shipments. Two prices continue on narrow low-carbon cold strip, Worcester base, 3.75c and 3.40c for 0.25 carbon and under, but the two suppliers billing the former about equalize the final price by lower skid charges, coil weights and other differentials.

New York — To the extent sheet mills operating on a monthly quota schedule have allocated for October, flat-rolled producers are in fourth quarter with no indications of an early improvement in balance between supply and demand. For the opening month of the last quarter, some warehouse distributors have received cuts of 20 per cent in hot-rolled sheet allocations. Prognosticators who saw an approach to supply-demand balance in sheets by the end of third quarter are taking rain checks for the fourth; not before early 1948 is their current prophecy. Yet, hot-rolled sheets account for around 12 per cent of total net shipments of steel, cold-rolled nearly nine per cent, galvanized just under three per cent and electrical-enamelling 0.9 per cent. Given the semifinished and uninterrupted production, shipments of hot-rolled should approximate 7,500,000 tons this year, while cold-rolled should reach around 5,500,000 tons.

Philadelphia—In practically all grades of carbon sheets, consumers may expect no increase in tonnage for the fourth quarter. In fact, most suppliers on a quarterly quota basis, with carryovers from the third period, now making up schedules for the last three months of the year, expect to have less open tonnage for October at least. Mills operating on a monthly allocation basis also reflect this situation for the opening month of the final quarter.

Despite the heavy order backlog in sheets and pressure for tonnage, buying on the whole is more realistic and geared to what may be expected in the way of supply. Lack of flat-rolled material has brought about the abandonment of some planned production programs on some products by new consumers. This accounts in part for a slightly better supply of lower-grade electrical sheets to established users. An improvement in delivery on some sizes of fractional horsepower motors may stem from this.

On the other hand, consumers of light-gage hot-rolled carbon sheets, having lost their source of supply earlier and seeking to substitute cold-rolled, are unable to get on producers' books. They were too late. In the final analysis of the critical situation in flat-rolled, there is ample evidence to substantiate the conclusion that many buyers called the turn erroneously, having failed to interpret the market correctly and having jockeyed too long in adjusting purchasing policies.

Pittsburgh—Sellers are unwilling to divulge extent of pending upward price revisions on sheet and strip items. Most producers indicate there will not be an across-the-board increase in prices but rather price adjustments will be made on basis of individual product production costs.

Indicated price action is expected to result in a more equitable profit margin for each product, and should make possible a more balanced output between the various sheet and strip items. Effort on the part of industry in the past to achieve the most favorable product mix from the standpoint of profit has been considered one of the major factors in

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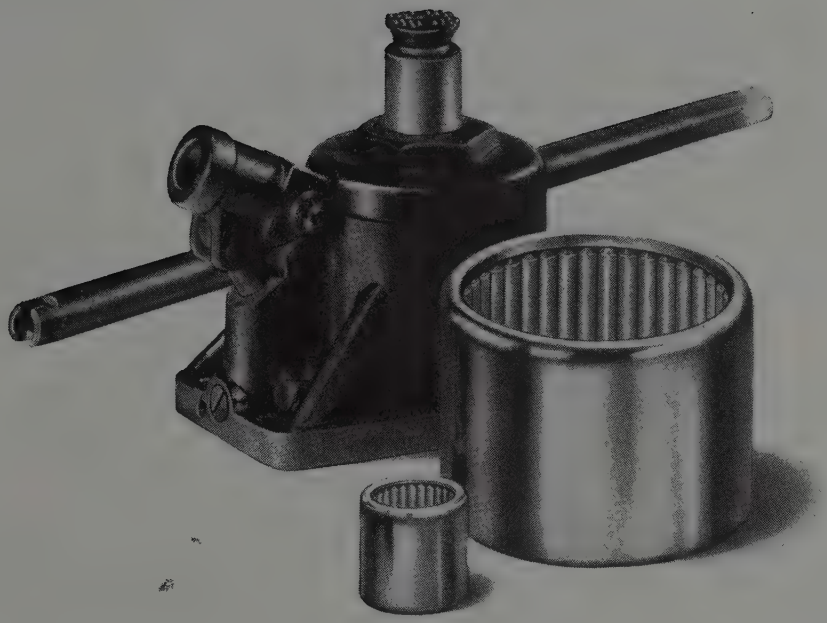

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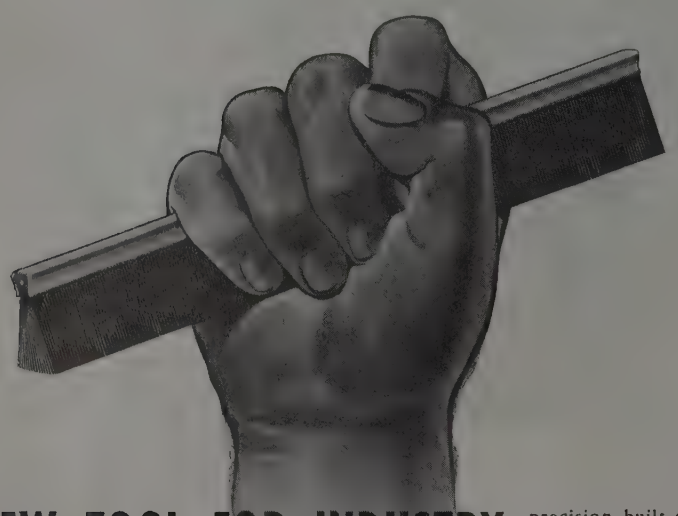
the unbalanced supply among flat-rolled steel items.

Industry officials, for example, do not anticipate substantial improvement in galvanized sheet output unless pending price revision results in a better profit margin. However, production emphasis probably will be continued on those specific flat-rolled steel items required for government-sponsored programs, such as food packing, housing, agricultural implements and freight car construction.

Cincinnati — Production of district sheet mills has been maintained at a high level, with no interruption from lack of coal. Pressure for shipments has not relaxed in face of mass vacations in some industries. Principal interest centered about pending advance in steel prices.

Chicago—Short supply of flat-rolled steel products appears to have encouraged closing of manufacturing plants the first two weeks of July for mass vacations, for the move was more widespread this year than ever before. In no known instance, however, did consumers cancel tonnage on order or request deferring of shipments against quotas. Rather, arrangements were made to receive and unload all incoming material, with the idea that reopening of plants would find bolstered inventories. Sheet and stripmakers see no prospect that balance between demand and supply will improve appreciably during the rest of 1947.



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Plates . . .

Plate Prices, Page 163

Boston — Still most cramped for plates are users fabricating the smaller gages, notably welding quality, including small tank builders and miscellaneous industrial consumers. Although there is no outstanding improvement in supply, heavier quality plates are less stingent and producers of weldments and flame-shaped heavy parts are not pinched to the extent of most shops fabricating the former sizes and grades. This reflects selective bookings through and beyond this year. On the other hand, plate shops are not placing new orders beyond foreseen requirements to the extent prevalent earlier this year, but warehouses seek more tonnage. In view of the decline in shipbuilding, demand for floor plates is unexpectedly high and deliveries on this type of plate are about normal.

New York — Pressure for delivery on plates has increased. Numerous fabricating shops are in need of material and others are anxious to get in tonnage ahead of an expected price increase. For the latter reason, other finished steel products are also under delivery pressure.

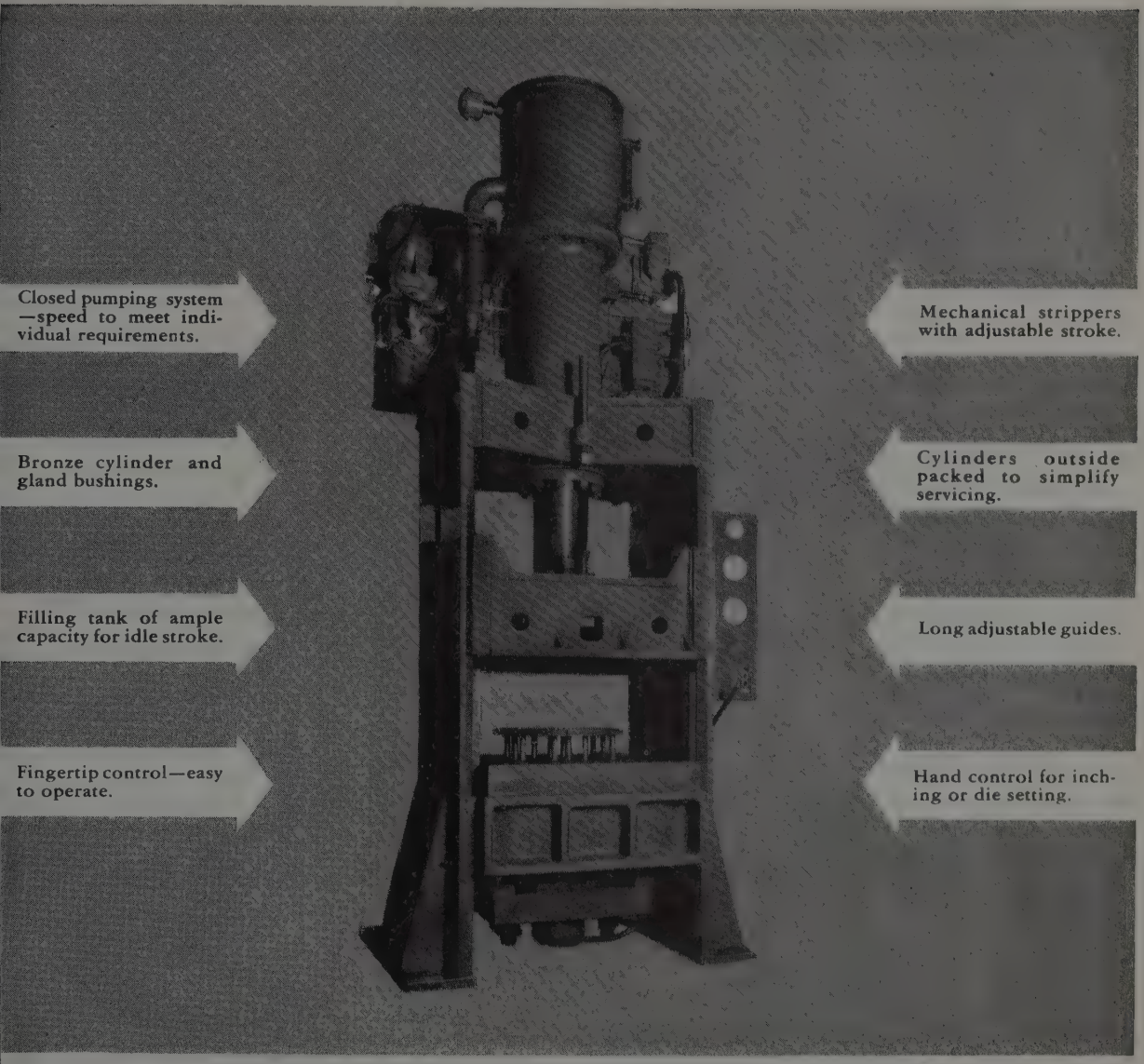
Price structure for plates is mixed. Premiums, selectivity in order acceptance and economic factors involving freight absorption are all contributing to an unbalance in distribution. Another factor is the requirements of integrated fabricating shops for heads, flanged work and weldments; most of these are scheduled at a high rate and account for a fair slice of affiliated mill output. This situation is not likely to be remedied until supply gets into better balance. Notably hard hit are users of 3/16 to 1/4-inch plates with some producers shying away from this tonnage in favor of heavier quality material. Fabricators are also seeking to place fourth quarter orders, and in some instances as car builders with going allocations, last quarter tonnage is in effect placed. Shipments to car shops are heavy and in some cases have been in excess of assembly schedules.

Philadelphia—Plate production is still hampered by materials shortages, notably pig iron. Fourth quarter tonnage includes carry-overs and some mills are more selective than ever in booking new volume. Current operating capacity is far below the war period when sheet mills were pressed into service to produce record-breaking volume. With this capacity now engaged on sheets, particularly hard hit are lighter gages, 3/16 and 1/4 inch. Sheared mills are ducking this class of volume and small tank and other fabricators are short.

Car building shops are taking a substantial slice of plate production, more than is being fabricated at current assembly schedules in some cases. Mills are ahead of the unofficial Washington mark in this regard.

Maritime Commission is taking bids Aug. 13 on five 500-foot combination passenger-cargo ships, but bulk of shipyard activity is on repairs and reconversion, notably the latter, a type of contract requiring few plates. Bethlehem Steel Co. yards have a $15 million reconversion contract for "export line" ships.

Seattle—Plates continue scarce and due to this condition plants are hesitant in making bids on large contracts. Columbia Steel Co., San Francisco, was awarded a contract for 3550 tons of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Steel Bars . . .

Bar Prices, Page 162

New York — Hot-rolled carbon bar allocations will not be increased generally for fourth quarter in sizes in heaviest demand, rounds one inch and under, flats and some medium sizes. While the overall supply of bars has improved, progress in this direction has been chiefly in cold-finished and alloy; there is also some decline in demand for cold-drawn, with a mild flurry in heavier hot-rolled stock. Bolt and nut shops are still short of carbon bars and prospective allocations for next quarter will not remedy unbalances in inventories. Fastener buying is heavy in the so-called assembly pieces, taking bars one inch and under which are in the tightest size ranges. Fabricators using a wide range of bar stock have deliveries from four to six weeks on stainless and alloys to an indefinite four to five months on some hot-rolled carbon.

Pittsburgh—Overall alloy bar output since the termination of the war has held up better than anticipated, despite fact that the mills are now able to offer relatively prompt deliveries from 4 to 6 weeks. Requirements for merchant, carbon and alloy bars as well as cold-finished should increase moderately over the coming months, reflecting better balanced inventory positions of most consumers.

In recent months acute shortage of sheets and strip have forced some metalworking plants to hold up shipments of component parts from their suppliers, which in turn has adversely affected production schedules of those companies involved. Acute pressure for deliveries of merchant carbon bars, notably in the smaller size ranges, is indicated throughout remaining months this year.

Chicago—An already tight situation in the smaller sizes of carbon bars was aggravated here last week when Wisconsin Steel Division of International Harvester Co. was forced to suspend operations starting July 12 when its workers struck after failure to negotiate a new contract with the company. Principal product of the company is hot-rolled bars, and loss of this output handicapped not only International Harvester plants, but many outside consumers as well. On July 16, Republic Steel Corp. restarted its 21-inch billet mill which was out of commission for several months while it was being dismantled and moved from the old plant in South Chicago to the adjacent plant which the company purchased from the government last December.

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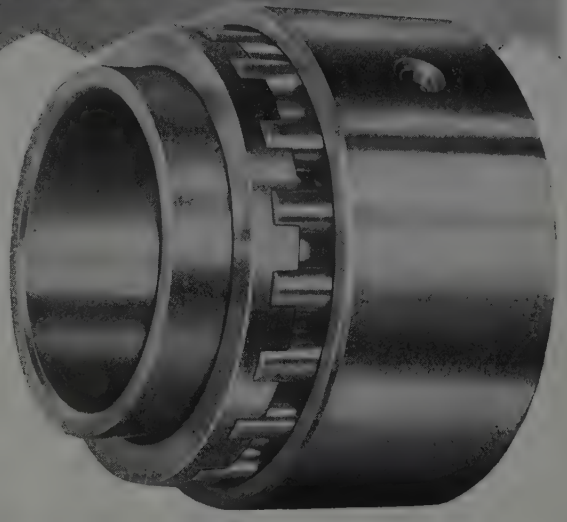

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 162

New York — With the supply of concrete reinforcing bars insufficient to meet current demand, the shortage is emphasized by heavier inquiry. New Jersey has bridges up for estimates between July 29-Aug. 7, requiring close to 1900 tons, mostly work in Newark. Bar fabricators and distributors are not quoting on most inquiries and contractors with engineering projects are forced to shop widely for tonnage. Most sellers are committed to the extent of reinforcing tonnage available and are in no position to take on additional orders.

Pittsburgh—Substantial increase in plain concrete bar prices is expected by industry officials. Prior to the price advance last January concrete bars were definitely being produced as a loss item, while in recent months the profit margin has been so slight that some producers are still operating at a loss. On fabricated work the profit picture is better, which has accounted for the fact that some of the larger interests have been channeling considerable portion of their concrete bar output to fabricating subsidiaries. Sellers state new inquiries are holding up very well, and due to unbalanced demand-supply situation there is good prospect that distribution will remain under strict allocation through the remainder of this year.

Other rerollers soon are expected to take similar price action as that put into effect July 14 by Sweet's Steel Co., Williamsport, Pa., in advancing prices $5 a ton on light (rail steel) rails and rail steel concrete and hot-rolled carbon bars. Price advance is necessary due to increased costs for rerolling rails and abnormally high price for scrap. Rerollers have been an important factor in helping relieve the present shortage in reinforcing bars, but their operations have been retarded by scarcity of good quality rerolling rails.

Seattle—Rolling mills, with backlogs extending to the end of 1947, are operating steadily here. Many small jobs involving 20 to 30 tons of reinforcing steel have been taken for industrial and commercial construction. Several sizable

The Steel Situation

THE adequacy of steel supplies is a subject of continued concern for both consumers and the steel industry itself. Many consumers unable to obtain steel, feel that capacity should be increased considerably. The steel industry, on the other hand, recalls vividly that 62 per cent of its capacity was idle during the five years beginning with 1930 and that 41 per cent was not used in the 5-year period ending with 1939.

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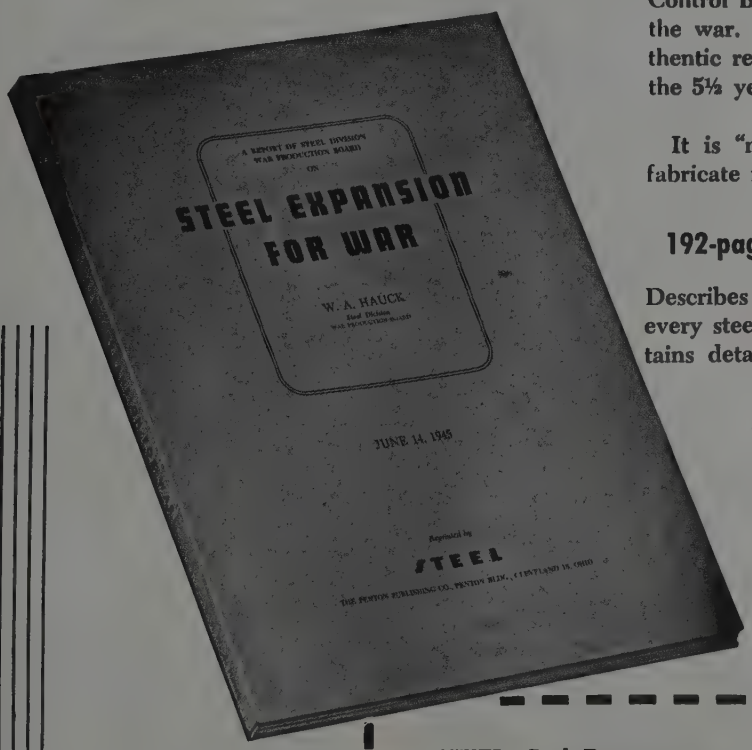

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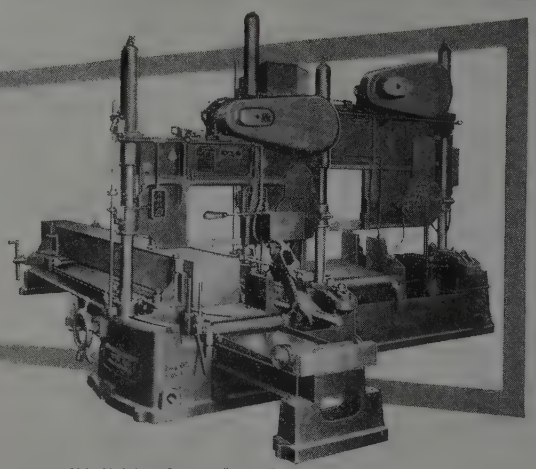

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tonnages are to be placed shortly, the largest being the University of Washington administration building calling for about 1000 tons.

Northwest Steel Rolling Mills, Seattle, will reopen its rolling mill July 23, following a 20-day shutdown for overhaul during which time an inventory of 2000 tons of ingot was accumulated.

Wire . . .

Wire Prices, Page 163

Boston — Wire mill production is approaching prevacation levels, but tonnage lost this month will amount to at least half that of recent months. While this was anticipated, more production was lost in some cases than was estimated. While it is difficult to evaluate the slackening in wire demand from an overall standpoint, due to the multiplicity of products, there is more easing in a greater number, reflected in less pressure on some, including music wire. Some sizes of the latter may now be shipped from stock.

Opening of fourth quarter books by some eastern mills finds scattered openings for tonnage in various categories, although there are limitations on high carbon specialties. Other producers are not setting up fourth quarter allocations until about Aug. 1 with indications no heavier tonnage will be available on some grades, but more on others. It is apparent most spring makers and razor blade producers have balanced inventories on a basis of current replacement demand. Call for valve springs and other automotive requirements is maintained.

New York — Slight easing in wire is indicated by less pressure for deliveries in some quarters. Deliveries last month brought some inventories up materially, although stocks are still out of balance. Improved shipments of drawn wire to bolt and nut shops in the range No. 5 gage to 0.442 are noted. Pressure for spring wire is off some. Rods are tight, although a shift in control of a New England nonintegrated mill has released a small tonnage to other users in the East. On the whole, rod producers are finishing a higher ratio of their own rods and, therefore, have less tonnage to sell.

Pittsburgh—Output of manufacturers' and merchant wire products is back to normal reflecting resumption of operations at American Steel & Wire Co.'s Donora and Rankin Works following complete shutdown for vacation. However, at midweek production schedules at the company's Donora plant were threatened by a wildcat strike of 800 employees at the zinc works in protest over alleged wage inequities.

Sellers anticipate a substantial price increase of at least $5 a ton on wire rods, while increases for wire items are expected to vary considerably depending on specific finishing costs involved. Indicated price revisions are expected to result in a fairer profit on all wire items and should encourage more balanced mill output productwise.

Pressure for deliveries of fine wire is well sustained, except from the New England area while coarse wire remains in very heavy demand. Large expansion in wire rope production facilities during the war is reflected in relatively easier mill delivery position on this item. Some slowing up in requirements from the bedding industry is noted, with result that openings in production schedules for special MB spring wire occasionally

occur. Little improvement in wire rod supply is indicated through remainder of this year. Jobber's stocks of merchant wire items continue badly out of balance.

Chicago—Consumers of all classes of wire and wire products are pressing wire mills for deliveries and complain regarding the inadequacy of quotas assigned them. Merchant products, including barbed wire, fencing, bale ties and fence posts, are in particularly tight position. To some extent, flood conditions in the Mississippi river area have aggravated fencing items, since much replacement must be undertaken. An important wire producer in this district has concluded a two-week shutdown for vacation and production and shipments are being resumed.

Structural Shapes . . .

Structural Shape Prices, Page 163

Boston—With the award of 3000 tons, two power plants, by Stone & Webster Engineering Corp. and 2100 tons, state bridges, Maine and Massachusetts, active pending structural tonnage is near the low point in the postwar period. Power plant contracts, both projects outside the district, went to Bethlehem Steel Co., while Phoenix Bridge Co. will fabricate the largest bridge job, 1625 tons. Only a few small bridge spans requiring little shop work and scattered industrial, educational and commercial projects are up for estimates; construction of the latter type requires stabilization of costs before going ahead. In tapering off, demand for heavier material is slackening more than for light; average job going out of structural fabricating shops leans toward lighter weight sections. Mystic river bridge will be of the cantilever type and will take in the neighborhood of 35,000 tons.

New York—Contrary to the general trend, sharp increase in estimates for New Jersey state bridges marks structural steel developments; inquiries involving six contracts for eight bridges, viaduct and overpasses will be bid at Trenton between July 29-Aug. 7. Most are located in Newark and the largest, viaduct over the Pennsylvania and Lehigh Valley tracks, takes 3155 tons. Bridge inquiry in other nearby states is slow, notably New York. While engineering projects with a fair prospect for prompt earnings on investment are going ahead with some delays, other types of building are affected by fluctuating costs. As regards fabricated steel the bulk of order backlogs are covered with escalator clauses. Neither the price of steel, shop costs and erecting charges have stabilized for a full return to firm prices.

Buffalo — While slow deliveries and unstabilized prices have checked progress in the construction field, the volume of industrial and commercial work pending in this area is the greatest on record. Approximately $400 million worth of construction, other than residential, will get under way in the twenty-county western New York area within the next year, according to District Manager Earl R. Mason of the U. S. Housing Expediter office. This is about three times greater than the amount started in any other single year.

Philadelphia—Substantial increase in bridge inquiry emanating from Pennsylvania and New Jersey features developments in fabricated structural steel. Close to 10,000 tons is active in the two states, although of the 5115 tons bid or up for estimates in the Keystone

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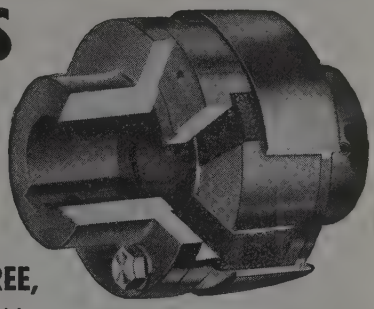

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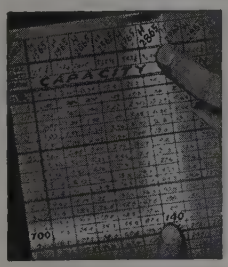

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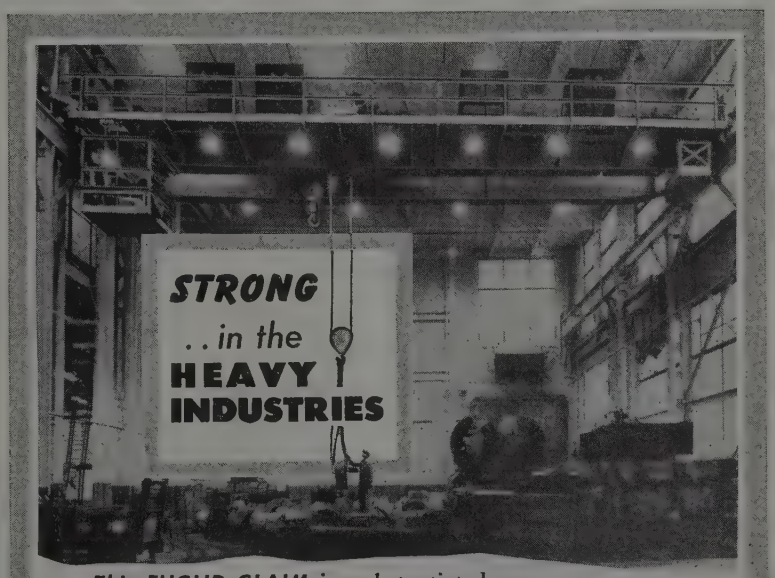

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state, more than half has been tentatively placed. Contracts also include 2500 tons, subway section, Philadelphia.

In view of high and nonstabilized building costs with fabricated steel going as nigh as $300 a ton erected, activity is surprising. Pressure for plain material is heavy but little is available beyond quotas. When spot openings do occur, which is infrequent, tonnage is quickly distributed and generally in small lots.

Chesapeake & Ohio Railroad has let contracts for a low-level coal dumping pier, Newport News, Va., to cost in excess of $5 million. Link-Belt Co., Philadelphia, will fabricate dumpers and conveyors; Alliance Machine Co., Alliance, O., the traveling towers.

Chicago — Structural fabricators regard higher steel prices as inevitable, but while they are protected against loss by escalator clauses in contracts for fabricated work, they are hoping it will not be necessary to invoke the clauses. Shops are booked for the balance of the year and in some cases longer, and are not concerned that higher steel prices would result in much of the tonnage being canceled; but for the long range, higher construction costs most certainly will restrict volume of new work coming out. Following several weeks of light inquiries and awards, a sharp upturn in both has occurred in the past few days. Some of the awards, however, have been slow in formal announcement.

Seattle—Fabricating plants report a steady run of small jobs for store and industrial construction, no large tonnages having been placed locally recently. Plants are trying to clear current orders and hesitate to accept larger commitments until steel supplies are more favorable. Mill allocations are entirely inadequate for current needs.

Tubular Goods . . .

Tubular Goods Prices, Page 163

Seattle—Midseason inactivity is evident in the cast iron pipe market, although this may be attributed to the deferred deliveries specified in offers. A large demand for tubular goods will develop in this area as quickly as mills can improve their position. Because of slow deliveries of cast iron, other types of pipe have been purchased for many projects. Award of 3000 tons for Seattle is pending.

Tin Plate . . .

Tin Plate Prices, Page 163

Pittsburgh — Extension of tin plate coating regulations to March, 1948, indicates the narrowing margin of pig tin reserves. It is contended that pig tin stocks would be depleted before first of the year if tin coating restrictions were to be dropped. Since March 1, government's stock of pig tin has receded from 19,059 tons to 12,103. However, increased receipts through remainder of this year is expected to at least retard present downward trend in inventories.

There is some indication that fourth quarter export load will exceed the 120,000 tons scheduled for the current period; at best it is not expected to be less than this figure. As in the case for third quarter, record foreign requirements are expected to be thoroughly screened so as to meet only essential needs. Third quarter export load was trimmed down from 240,000 tons original stated requirements.

Despite predictions of some easing in food packing requirements, tin plate producers expect continued heavy pressure for deliveries through remainder of this year. Expanding demand for general line cans, depleted inventories and prospect of higher 1948 tin plate contract prices, are said to be the primary bullish factors in present market.

Warehouse . . .

Warehouse Prices, Page 165

New York — Increases of $1 to $2 a ton on several warehoused steel products, effective July 15, reflect higher truck delivery costs; included are structurals, hot-rolled rounds, one-quarter inch and heavier, flats and bar size angles, bands, cold-rolled sheets, plates and floor plates. Advances are $1 in most cases, carbon plates being increased $2. Bar size channels, tees, zees, squares, hexagons, ovals, half ovals, threading and twisted squares are also included in the $1 category. Hot-rolled carbon sheet price is unchanged.

Philadelphia—While supply of cold-finished bars is showing continued improvement, overall shipments to warehouses thus far this month are lower, notably in the shortest products which include flat-rolled, structurals, plates and wire products. Considering the closing of numerous consumer plants for vacations, demand is holding and is well in excess of ability of distributors to fill on critical items. Alloys, stainless, tool steel and a few scattered products generally balance demand which is substantially under that for most hot-rolled carbon steels.

Cleveland — Warehouses here were able to stock some material last month due to heavier shipments from mills. Their quotas for July may not be fully met, however, due to reductions in mill operations as result of vacations and interruptions at the beginning of the month during the fuel crisis. Some distributors have larger stocks of plates, round bars and structurals. Customers are somewhat more exacting in their specifications but still take substitutes readily on most items, especially flat-rolled and small size bars. Jobbers anticipate a price advance at the mill level, but believe any further rise will adversely affect the volume of business. They point out that they have been forced to raise prices since the first of the year due to earlier advances at the mill level, increased trucking rates plus delays in loading and unloading which also boost costs, and pay raises for warehouse workers. The danger lies in the progressive restriction of markets of their customers as they are priced out of the market.

Cincinnati — Mill replacements in warehouse steel have been much lighter in recent weeks so that inventory position in scarce items may be near an all-time low. Unless there is early improvement, sales will shrink badly. Stocks of cold-finished items are adequate, partly due to decreasing demand from machine tool builders.

Seattle—The warehouse trade reports a steady volume of business, all items being in active demand. Inventories remain low and some items are entirely out of stock. Sheets, nails and reinforcing bars are still critical. Mills are rolling larger specifications, consequently ¼-inch bars are entirely out while ⅜-inch and ½-inch are extremely short. Some

cold-rolled items are in short supply while the sheet situation continues tighter with no immediate relief promised.

Semifinished Steel . . .

Sales negotiated by smaller interests at levels well above quoted prices

Semifinished Prices, Page 162

Pittsburgh—Upward price advance of $2 to $3 per ton for semifinished products is expected to be announced soon, with greater price increases for finished steel items depending on individual product costs factors.

Sales of rerolling billets, blooms, slabs and sheet bars by smaller interests continue on a negotiated basis at prices well above quoted levels. Substantial tonnage of carbon sheet bars, for example, recently were sold as high as $92 per ton, in contrast with published price by major seller of $53.

Portsmouth Steel Corp. has not been accepting orders for wire rods for some time now, and expects to wind-up present commitments this fall. Withdrawal of this interest from the wire rod market leaves Pittsburgh Steel Co. as only producer selling rods at the $2.80 per 100 pound price level.

Recent curtailment in primary steel production during coal miners' vacation period has further tightened supply of most semifinished steel items.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 164

Pittsburgh—Connellsville beehive coke operators have increased furnace coke prices $2 a ton and foundry coke $2.50 to $3, retroactive to July 1. Furnace beehive coke prices are now established within the range of $11.50 to $12.50; Connellsville foundry coke at $14 to $15. Sellers of oven foundry coke are making shipments on basis of making whatever price increase develops retroactive to July 10.

Oven coke operators as yet have no definite report as to the extent coal prices will be increased under the recent UMW wage contract. Until this matter is determined no official price action will be announced, although it is indicated that an advance of close to $2 per ton shortly will be put into effect.

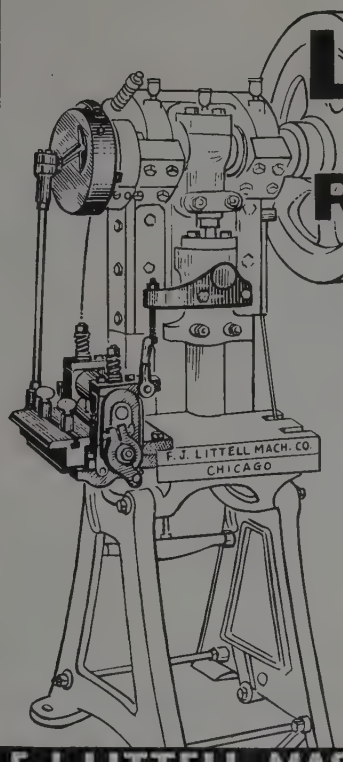
Domestic Coal and Coke Prices Advance in South

Birmingham — Price increases ranging from $1.50 to $1.75 were posted here last week on domestic coal by retail yards. They announced comparable mine increases had been made to them. Coke for domestic use was quoted at $13.45, up $1.75 a ton. High grade domestic coal was $12.50, up $1.50. Stoker coal, at $11.75 also was up $1.50.

Alabama's captive and commercial coal mines were back on virtually normal production schedules with a steel ingot production rate of 99 per cent.

Increasing concern is expressed over the situation in Alabama due to higher production costs of coal and steady encroachment by competitive fuels.

I. W. Rouzer, president, Alabama



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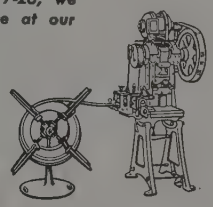

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Mining Institute, said indications are that many miners will lose their jobs and some operators will lose their investments as a result of the state's inability to compete due to less productivity, thinner seams, higher washer costs and other factors beyond control.

Pig Iron . . .

Southern producers raise prices $3.50 a ton to offset increased costs

Pig Iron Prices, Page 164

Boston — Any advance in pig iron prices at Buffalo and other outside points will not be sufficient to influence the Everett base under the mutual co-operative agreement on which most consumers of foundry grades are operating to the extent of 60 per cent of requirements. Even with the advances, outside iron if available, would be priced under Everett; price of the latter is still tied in to within $5 of the Buffalo delivered price. Not for the predictable future is price likely to be a major factor in the distribution of iron in this area. Supply will have to improve before price is a serious consideration. Meanwhile the 15,000-ton production at Everett is spread broadly each month among foundry melters, production schedules covering one week of malleable production. This isn't enough to cover the entire melt without some outside shipments, but takes the edge off what might be a serious supply situation.

New York — Pig iron continues in short supply with foundry inventories low despite some slackening in melt for vacations. For the forseeable future no substantial improvement in available merchant iron tonnage appears in sight. With steel operations taking up integrated furnace capacity through the balance of the year, which seems probable, little foundry iron may be expected from that source for months. Normal price differentials between iron and scrap are again more out of line, although the shortage of iron forces a high ratio of scrap in melts, dangerously high in spots which is showing up in hard and off-quality castings.

Buffalo—With wage increases granted to coal miners, talk became louder that higher pig iron prices were not too far away. Producers made no effort to conceal ambitions to pass along increased operating costs to buyers. Hot weather and vacations have made appreciable inroads on current foundry melt, but sellers find no trouble in disposing of entire present output.

Buffalo interests, whose names are withheld pending completion of the deal, submitted the high bid of $175,000 for the structure of the former Otis Elevator foundry here. The property was auctioned last week. The foundry and its equipment were valued at about $1,000,000. Approximately 150 bidders from various sections of the country attended the auction.

Philadelphia—An increase in prices appears imminent and consumers are expecting an advance. Foundry melt will be down slightly this month due to suspensions, but inventories are not being increased because of lack of iron. Some steel works are in need of basic. Bethlehem, Pa., has finally been adopted as a basing point for southern iron moved to the Philadelphia area.

The Chester, Pa., blast furnace, rehabilitated during the war at government expense, is not expected to operate again. In fact, the furnace will be cannibalized to supply parts for other furnaces.

Pittsburgh—Lone merchant pig iron producer here has not yet taken any action on revising its prices. However such price action is anticipated before the weekend.

Although pig iron production in this district is back to practically capacity levels, the general shortage is anticipated through most of this year. The anticipated easing in demand for foundry operations has not yet developed and according to leading interests there is no sign of a recession in operations. Inadequate coke supply continued to be chief retarding factor in achieving capacity foundry production schedules.

Cleveland — Northern pig iron prices remained firm last week following the advance in southern iron. It was pointed out here that production costs in the South have had a larger proportionate advance than in this section, requiring special relief for Birmingham producers. Pig iron production in this district has returned to the rate in effect prior to the coal miners' vacation.

Cincinnati — Shipments of pig iron have picked up, with expectations that they will soon be at normal volume. Furnace interests were uncertain whether allotments for July will be completed because of the shrunken output during the coal miners' holiday. Since the melt was off early this month for vacations, attempts to augment pig iron stocks were frustrated. Announcements on furnace price policies are awaited.

Chicago—Foundries in this district face not only rising costs of raw materials but shorter supplies of iron and coke. Foundry coke advanced $1 a ton a week ago, and higher iron prices are expected shortly, rising production costs brought to a head by the coal mine settlement being cited as the reason.

No. 5 blast furnace of Youngstown Sheet & Tube Co., South Chicago, banked June 25 as a coal conservation measure, resumed July 13, but a strike at Wisconsin Steel Division, International Harvester Co., South Chicago, forced the company to bank its three blast furnaces July 11. Thus, only 35 of the district's 41 blast furnaces now are operating. A blast furnace of Inland Steel Co., heretofore making foundry iron, has switched over to basic and from this point on will alternate on the two grades for 30-day periods. Foundries, holding heavy order backlogs for castings, are discouraged over the recent turn of events.

Birmingham—Sloss-Sheffield Steel & Iron Co. and Republic Steel Corp. last week posted an increase of $3.50 a ton on southern pig iron, bringing No. 2 foundry, to $33.38, Birmingham, highest price since World War I.

The price increase, according to Sloss officials, is to "partially" offset the increased cost of production.

Seattle—Due to the coal situation, no pig iron is coming into this area at present but with allocations lifted it is expected that foundries will be supplied soon. Cast iron scrap is easier and plants are covering their requirements. The price remains firm at $27.50. Foundry operations are close to capacity but a drop in inquiry is noted.

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Scrap . . .

Price trend continues upward with supplies short . . . Sale made at $36, Pittsburgh

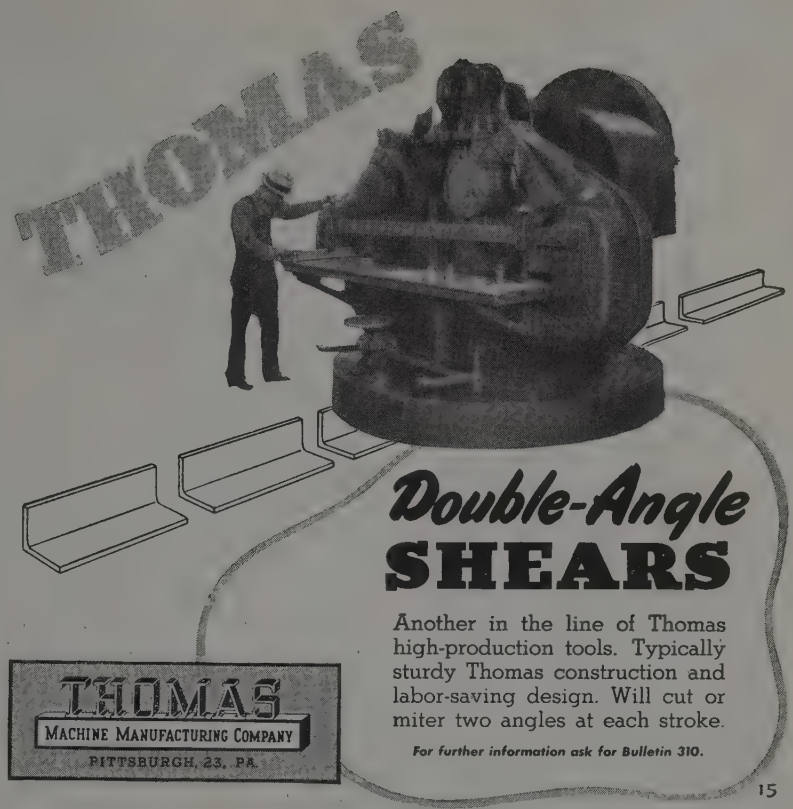
Scrap Prices, Page 168

Pittsburgh—In sharp contrast to upward trend of prices in other districts, scrap quotations held steady early last week at around the nominal price of $35 per ton for heavy melting steel. Late last week, however, a small sale was made to a mill at $36 delivered. Mills claim to be in good position with regard to inventories, due to large influx of scrap from customers; in fact during period of recent interruption to ingot and blast furnace operations, the leading producer was able to augment scrap stocks. However, on the basis of scrap quotations in other districts, it is obvious that when the mills again enter the market they will be unable to contract for sizeable tonnages at old levels for heavy melting steel. Stronger market continues in turnings, with prices again advanced 50 cents. Decision on part of railroads to allocate or earmark a greater portion of their scrap probably will have a dampening influence on recent surge in prices for railroad items. Scrap collection efforts have not been stimulated to any extent despite recent upturn in prices in other districts. Overall scrap supply is expected to remain scarce through most of this year because of practical capacity steel ingot, blast furnace and foundry operations. This condition has been accentuated also by shortage of coke and pig iron. Widespread vacation shutdowns among many metalworking plants has temporarily cut into available supply of industrial scrap.

Boston—Increases of $1 to $1.50 in open-hearth scrap, heavy melting, machine shop and short shovel turnings are based largely on broker buying against old orders. Consumers are resisting the advances and are not buying beyond needs. Some have built up scrap reserves, but not all. In any event, more resistance to the higher trend is developing. Activity in cast grades in mostly for Pennsylvania melt and broker buying for those accounts appears to be holding price levels above what they might be if volume was dependent on district activity

New York—Steel mill scrap buyers are not meeting the sharply increased prices in open-hearth grades and the advance is largely due to broker bids for material to fill old orders. In the case of heavy melting steel, price has jumped nearly $3 a ton to $35, shipping point, while other grades are also up. Cast iron scrap prices are generally unchanged with the exception of malleable which is $1 higher.

Buffalo — Pronounced strength swept through the scrap market last week as new sales were reported in steelmaking grades at prices ranging from $4 to $5 above the previous week. At least 5000 tons of heavy melting and bundles reached as high as $38 a ton, which compares with a range of $33 to $34 previously. Tonnage at the $38 figure was limited as dealers refused additional orders. Having suffered financial losses covering old sales, dealers acted warily in confining business to available tonnage. Even higher prices are indicated as consumers continue to press for scrap, while sup-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plies are not expanding as rapidly as many hoped for with the return of good weather. There are also signs that many of the old sources of scrap have been pretty well drained during the prolonged period of capacity ingot operations. Stiffer tendencies in the steel grades, however, were not immediately reflected in cast items.

Philadelphia—Most scrap grades have advanced moderately, including cast, advances ranging from $1 to $2. Melters of open-hearth grades are buying to the extent of maintaining inventories, although there is no inclination to overload reserves and hoard on this rising market. Part of the strength is reflecting broker bids to fill old orders. Yard receipts are somewhat heavier as current prices are more attractive to primary collectors.

Detroit—Wildest scrap market of the year is being experienced locally, with supplies short, demand boiling and brokers scrambling to cover short orders. Prices of open-hearth grades are up $1.50 per ton to $31.50 top, dealers' buying price, with mills here paying $35.50. Machine shop turnings are sharply higher by $3 per ton, at $26.50-$27.00, short shoveling up $3.50 per ton to $28.50-$29.00, and plate scrap up $5 to $38.50 top. All production scrap continues either to be channeled to specific mills or to be moving on "conversion" deals, by which a fabricating plant arranges to have its scrap melted and rolled into material for shipment back to its own plant. Result is a drying up of any reservoir from which dealers and brokers might obtain enough tonnage to cover short orders and a dogfight to buy up what little material is available. No easing of the situation is seen in the immediate future; in fact, talk is heard of $45 open-hearth scrap. Steel mills might logically relieve the pressure somewhat by discontinuing the practice of demanding scrap return from customers, thereby restoring the normal flow and routing of material but, human nature being what it is, there is little immediate hope for such action.

Cincinnati—Scrap prices are up $1, with the market so unstable that quotations were considered nominal. Some major interests in the district have stocks for temporary resistance to price boosts, but reports of higher neighboring markets strengthens the upward trend. Considerable tonnage in coming out despite speculative holding of material by some dealers.

Chicago—Mills continue to resist the upward trend in scrap prices by paying no more than $34 for open-hearth material of factory origin and $33 for material of dealer origin. New consumer buying is light. Situation is confused since prices of $2 to $2.50 above published quotations are reported freely in broker-dealer transactions as the former rush to fill old orders. Closing of manufacturing plants for vacations has reduced the supply of factory scrap and dealers' collections also are running light. Mills, however, report shipments are being received in fair volume.

Birmingham — Scrap prices jumped from $1 to several dollars a ton here last week in a highly speculative and confused market. Representative brokers said increases are subject to change "at any moment," and with a strong tendency upward. Resumption of full scale steelmaking, a general scrap shortage and movement of much tonnage out of the district is responsible for the increase, along with increased pig iron prices.

Seattle—Output for steel scrap supplies is satisfactory, mills reporting receipts slightly in excess of consumption. Inventories are gaining slowly. Eastern firmness for scrap has not affected the market in this area, $20, fob mill, being paid for No. 1 heavy melting.

Canada . . .

Toronto, Ont. — Demand for finished steel continues to exceed production by a wide margin here, producers being booked up solidly through the current quarter. Demand for sheets exceeds supply by about 50 per cent despite the fact that output is being maintained a capacity of available steel supply.

With a number of bar makers endeavoring to hold commitments to two months into the future, solid bookings through July and August are reported, with chief demand centered on lighter sizes. Some producers, however, are accepting most of the bar business offered, but are making no definite promise of delivery. Consumers in need of carbon bars, in many instances, have placed orders with several producers in the hope of obtaining speedier delivery, thus it is expected that as fillings are made cancellations will be put through to those barmakers that have not been in a position to make delivery in time. Alloy bar demand is steady, but producers still have unfilled capacity for this quarter.

Plate demand is moving ahead steadily and Canadian platemakers are holding their commitments to two months into the future. Domestic plate output is said to be running less than 50 per cent of market requirements and heavy buying from the United States has been reflected in a sharp increase in plate imports in the past few months. Plate users continue to report difficulty in obtaining sufficient steel for their needs and their plant operations have been handicapped as a result of this shortage.

Pig iron sales have been averaging close to 10,000 tons weekly, and producers have not been permitting large tonnage stockpiling by melters. Sales mostly are in lots from 50 to 200 tons. Pig iron production is holding slightly better than 70 per cent of rated capacity.

Scrap dealers state that receipts have been light recently and, while they expect early improvement in offerings, they do not look for any large outpouring of scrap as long as ceiling prices continue at their present levels. Most of the scrap on the market is from local sources.

Wage Increase Boosts Steel Payrolls 17%

Wage increases granted employees in April increased the steel industry's total wage and salary bill $18 million in April and $25 million in May, over the March wage bill of $150,560,000, according to the American Iron & Steel Institute. The April wage and salary total for the industry is estimated at $168,266,000, based upon actual returns from 120 companies, and the May total is estimated at $175,793,000.

Average hourly rate of pay for hourly, piecework and tonnage employees in May amounted to $1.556, almost 18 cents an hour above the March hourly rate of

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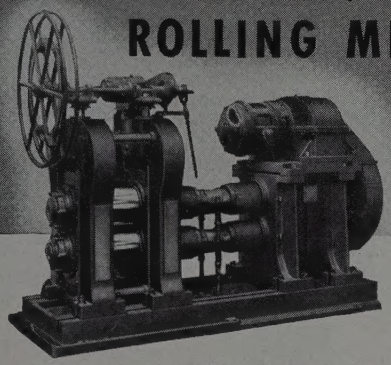

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55 Meters or 1940 cubic feet
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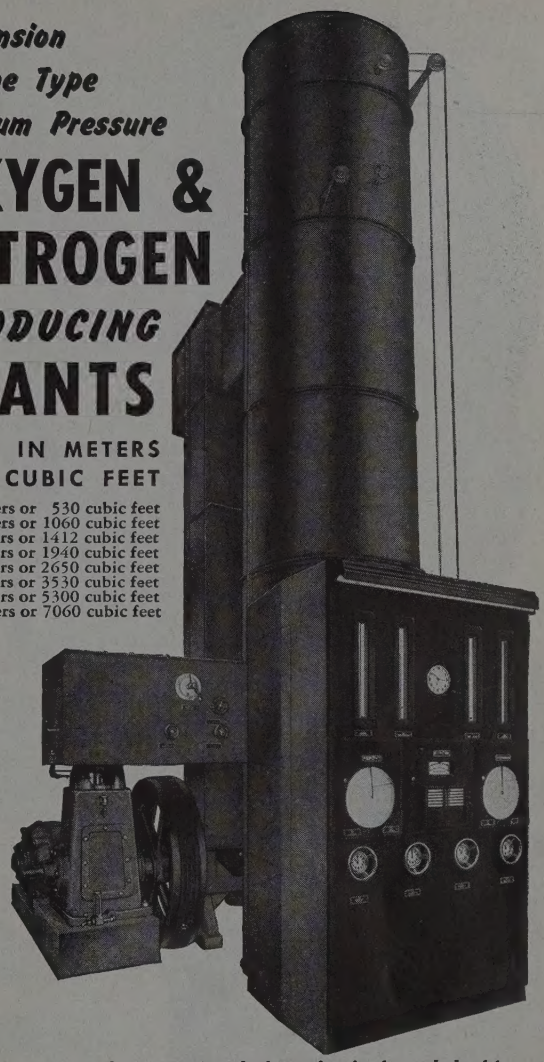

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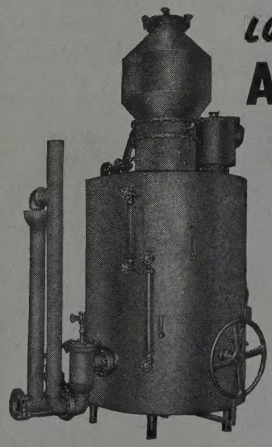

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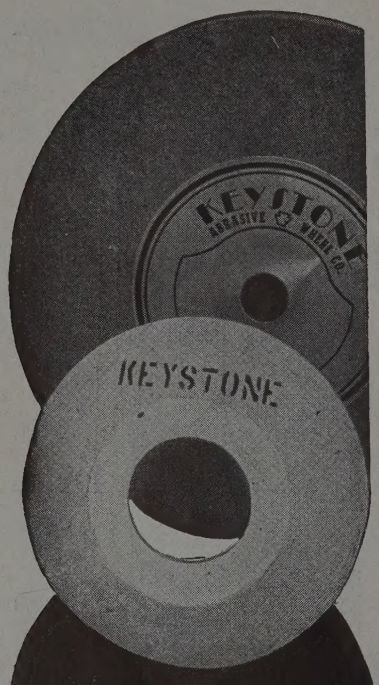

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$1.379, and slightly higher than the April average of $1.533. The May 1947 rate is almost 20 cents an hour higher than the average rate of pay during the corresponding month of 1946, which came to $1.358. Average hours worked by the industry's wage earners during May totaled 39.1, down from the April average of 40.0 hours per week.

In May, the industry's employees numbered 614,800, the highest total for the industry since 1943. Of that number 524,600 represented wage earners, with the balance comprising salaried employees. The corresponding figures for April were 610,700 and 520,700 respectively.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, Market St. subway section, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa., through George H. Flinn Corp., New York, general contractor.

2200 tons, power station, Braddock Light & Power Co., Alexandria, Va., to Bethlehem Steel Co., Bethlehem, Pa.; Stone & Webster Engineering Corp., Boston, contractor-engineer.

1800 tons, power plant extension, Indianapolis Power & Light Co., Martinville, Ind., to Joseph T. Ryerson & Son Inc., Chicago.

1600 tons, Sault Ste. Marie bridge, Michigan, for state, to American Bridge Co., Pittsburgh.

1520 tons, Missouri River bridge, Decatur, Nebr., for Burt County Bridge Commission, to Bethlehem Steel Co., Bethlehem, Pa.; Industrial Contracting Co., Minneapolis, contractor.

550 tons, steel framing, North State St. viaduct, Department of Public Works, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.; Overland Construction Co., Chicago, contractor.

450 tons, assembly plant, Chevrolet Motor Division, General Motors Corp., Janesville, Wis.; bids June 19. Albert Kahn, Detroit, architect-engineer; to R. C. Mahon Co., Detroit.

360 tons, manufacturing building, Aetna Steel Products Co., Pottsville, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

325 tons, three state bridges, Yarmouth, Me., to Bethlehem Steel Co., Bethlehem, Pa.; Ellis C. Snodgrass Inc., Portland, Me., general contractor; reinforcing bars awarded Bancroft-Martin Rolling Mills Co., Portland.

300 tons, building, Perfect Circle Co., Richmond, Ind., to Central States Bridge & Structural Co., Indianapolis.

300 tons, warehouse, Pennsylvania Sugar Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

206 tons, bridge, Cont. 2813, Rockville, Ind., for State Highway Commission, to Bethlehem Steel Co., Bethlehem, Pa.; R. L. Schutt, Indianapolis, contractor.

190 tons, crusher building, E. J. Lavin Co., Norristown, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

170 tons, furniture warehouse, Hardwick & McGee Co., Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.

STRUCTURAL STEEL PENDING

175 tons, Midland power plant, Commonwealth Edison Co., Chicago.

3152 tons, viaduct over Pennsylvania and Lehigh Valley tracks, route 25, section 34B, Newark, N. J.; bids Aug. 7, Trenton, Spencer Miller Jr., state highway commissioner.

1800 tons, power house, General Nebraska Public Power & Irrigation District, Bellevue, Neb.; Paxton & Vierling Iron Works, East Omaha, Nebr., low; Bates & Rogers Construction Corp., Chicago, contractor; bids July 12.

500 tons, War Memorial building, American Legion, Indianapolis; bids May 16; project abandoned.

1000 tons, building, *Indianapolis News*, Indianapolis; bids May 20; project abandoned.

860 tons, viaduct, Nashville, Tenn., for State Highway Division.

700 tons, state bridge, Allegheny county, Pennsylvania; bids Aug. 1 to Harrisburg.

665 tons, state bridge, Luzerne county, Pennsylvania; bids Aug. 25 to Harrisburg.

603 tons, bridges over Magazine St., St. Charles St. and Central Railroad of New Jersey, Newark, N. J.; bids Aug. 1, Trenton, Spencer Miller Jr. state highway commissioner; also 44 tons wrought iron blast plates.

355 tons, overpasses and retaining walls at Roanoke Ave. Manufacturers branch, Central Railroad of New Jersey, and Foundry street, Newark, N. J.; bids Aug. 1, Trenton, Spencer Miller Jr., state highway commissioner; also 18,900 pounds wrought iron blast plates.

280 tons, building, General Mills Inc., Kankakee, Ill.; J. L. Simmons Co., Decatur, Ill., contractor; bids July 8.

260 tons, building, Clawson & Bals Inc., Chicago; bids June 27; project abandoned.

227 tons, three bridges across Port St., Delancy St. and Lehigh Valley railroad siding, Newark, N. J.; bids Aug. 5, Trenton, Spencer Miller Jr., state highway commissioner; also 19,000 pounds wrought iron blast plates.

225 tons, highway bridge, Union Grove, Ill., for state; American Bridge Co., Pittsburgh, low; bids July 11.

185 tons, highway bridge, Arnold, Ill., for state; American Bridge Co., Pittsburgh, low; bids July 11.

125 tons, including sheets, 6-tier bookstacks, University of Washington library, Seattle; F. T. Crowe & Co., Seattle, low $169,073, for Virginia Metal Products Co.

100 tons, state bridge, Erie county, Pennsylvania; bids Aug. 1 to Harrisburg.

Unstated, stoplogs for emergency valves Bonneville dam; bids to U. S. engineer, Portland, July 27.

REINFORCING BARS . . .

REINFORCING BARS PLACED

750 tons, Addison St. sewer system, Department of Public Works, Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Michael Pontarelli & Sons, Chicago, contractor.

500 tons, Fall river channel improvement, Hot Springs, S. Dak., to Bethlehem Steel Co., Bethlehem, Pa.; Peter Kiewit & Sons, contractor.

155 tons, highway section, Wilbur Cross parkway, Hamden-North Haven, Conn., to American Steel & Wire Co., Cleveland.

105 tons, power house, Lake Superior Power Co., Ashland, Wis., to Bethlehem Steel Co., Bethlehem, Pa.; La Crosse Dredging Corp., Chicago, contractor.

REINFORCING BARS PENDING

975 tons, viaduct over Pennsylvania and Lehigh Valley tracks, route 25, section 34B, bids Aug. 7, Trenton; Spencer Miller Jr., state highway commissioner.

925 tons, sewer, S. Omaha, Nebr.; bids June 5; all bids rejected.

375 tons, addition to state school, Buckley, Wash.; general construction bids in.

335 tons, highway projects, McKean and Wyoming counties, Pennsylvania; bids Aug. 1 to Harrisburg.

275 tons, chemistry building, University of Illinois, Urbana, Ill.; bids July 15.

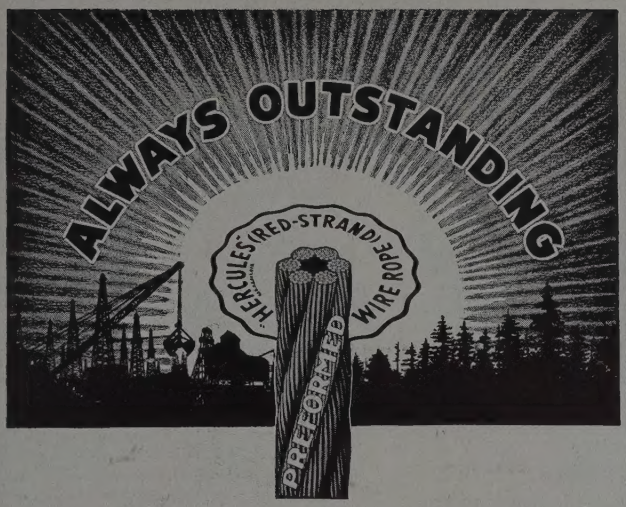
275 tons, Panama, sch., 8694; bids July 22.

200 tons, overpasses and retaining walls at Roanoke Ave., Manufacturers Branch, Central Railroad of New Jersey and Foundry St., Newark, N. J.; bids Aug. 1, Trenton, Spencer Miller Jr., state highway commissioner.

150 tons, bridges, Magazine St., St. Charles St. and Central Railroad of New Jersey, Newark, N. J.; bids Aug. 1, Trenton, Spencer Miller Jr. state highway commissioner.

117 tons, three bridges, Port St., Delancy St. and Lehigh Valley railroad siding, Newark, N. J.; bids Aug. 5, Trenton, Spencer Miller Jr., state highway commissioner.

115 tons, administration building, Aluminum



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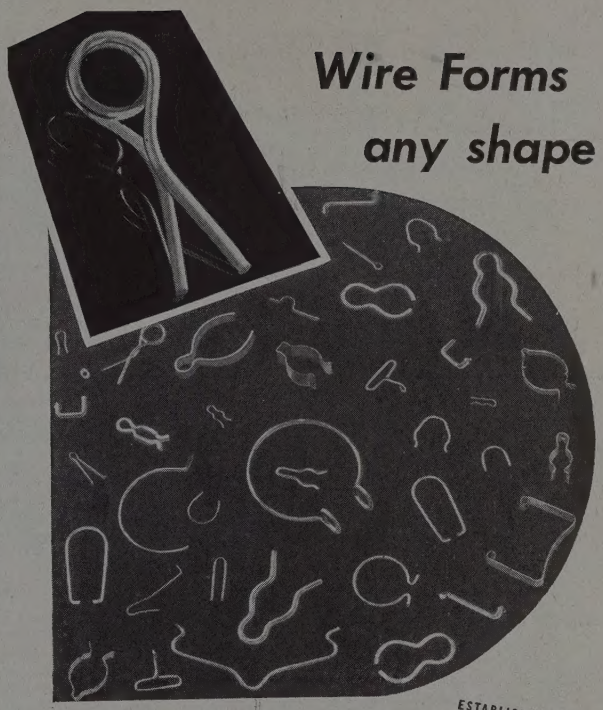

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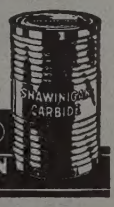

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171 York Street Rochester, N.Y.

Co. of America, Davenport, Iowa; bids in.

100 tons plus, concrete bridges and bridge expansions, Oregon state highway projects; bids to Portland, July 21.

100 tons, Washington state highway projects; bids to Olympia, July 22.

Unstated, North Shore intercepting sewer, Cont. No. 6, Sanitary District of Chicago; bids July 24.

Unstated, central wing, Sacred Heart Hospital, Spokane, Wash., including tunnels, etc., Gus J. Bouten Construction Co., Spokane, low; $900,000 project.

Unstated, addition to Central Washington Deaconess Hospital, Wenatchee; Atherton Construction Co., Seattle, low $338,969.

Unstated, 6000 foot, 12 foot diameter tunnel, Toketee Falls hydro-electric project; bids to California-Oregon Power Co., Medford, Oreg., Aug. 5.

PLATES . . .

PLATES PLACED

3550 tons web and tie section steel sheet piling for McNary dam, Oregon, to Columbia Steel Co.

100 tons, water tank, Chesapeake & Ohio railroad, Presque Isle, O., to Pittsburgh-Des Moines Steel Co., Pittsburgh, $42,000.

PLATES PENDING

3200 tons, 66 inch water supply line for Seattle; Valley Construction Co., Seattle, low $1,011,530.

Unstated, dam and water system for Westport, Oreg., also pump houses; bids July 19; pump award to DeLaval Steam Turbine Co.; W. T. Batcheller, Seattle, engineer.

Unstated tonnage, spherical tank, Bureau of Yards and Docks, Navy Department, Carderock, Md., spec. 18342, bids July 9, Chicago Bridge & Iron Co., Philadelphia, low, $45,900; alt. $56,500.

PIPE . . .

CAST IRON PIPE PENDING

2480 tons, centrifugally cast water pipe, Lot 4, including 60,000 feet 8-inch and 40,000 feet 12-inch, Department of Public Works, Chicago; bids July 23.

1500 tons, centrifugally cast water pipe, Lot 2, including 16,000 feet 6-inch, 50,000 feet 8-inch and 10,000 feet 12-inch, Department of Public Works, Chicago; bids July 23.

1158 tons, centrifugally cast water pipe, Lot 3, 60,000 feet 8-inch, Department of Public Works, Chicago; bids July 23.

410 tons, Class B water pipe, Lot 1, including 15 tons 3-inch, 20 tons 4-inch and 375 tons 16-inch, Department of Public Works, Chicago; bids July 23.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Baltimore & Ohio, twenty 3000-horsepower diesel-electric freight, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Minneapolis & St. Louis, three 1000-horsepower diesel-electric road switchers, to American Locomotive Co., New York.

Union Pacific, three 2000-horsepower diesel-electric passenger, to Fairbanks, Morse & Co., Chicago; three 400 horsepower switchers to General Electric Co., Schenectady, N. Y.; and one 1500 horsepower diesel-electric freight to American Locomotive Co., New York.

RAILROAD CARS PLACED

Armour Line, 1000 refrigerator cars to General American Transportation Co. and 1000 to American Car & Foundry Co.

Milwaukee, 1000 fifty ton hopper cars to Pressed Steel Car. Co.

Pennsylvania, 1000 box cars 50 feet, six inches, own shops, Altoona.

Reading, 1000 fifty-ton box, own shops.

RAILROAD CARS PENDING

Wheeling & Lake Erie, 1000 seventy-ton hoppers.

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BURBANK, CALIF.—Frame-O-Steel Door Co., 909 N. Lake St., has been organized by Michael Berceny.

EMERYVILLE, CALIF.—Paraffine Co. Inc., 475 Brannan St., San Francisco, has awarded a $100,000 contract to Dinwiddie Construction Co., 210 Crocker Bldg., San Francisco, for construction of a warehouse addition here.

LOS ANGELES—Los Angeles Metal Spinning Co. has been formed by Ray Garcia and Kenneth E. Loring at 3606 Avalon Blvd.

COLORADO

MEEKER, COLO.—White River Electric Association Inc. proposes to build a $248,000 additional generating plant.

ILLINOIS

CICERO, ILL.—Hotpoint Inc., 5600 W. Taylor St., has awarded a $750,000 contract for a factory addition to Abell-Howe & Co., 53 W. Jackson Blvd., Chicago.

KANSAS

WICHITA, KANS.—Bareco Oil Co., 424 Chey St., Tulsa, Okla., has awarded a $260,000 contract to Koch Engineering Co., 424 S. Chey St., for expansion and modernization of a refinery plant.

KENTUCKY

LOUISVILLE, KY.—Louisville & Nashville Railroad has OHE approval for construction of a $470,000 shop for the repair and service of 59 diesel engines.

LOUISIANA

BATON ROUGE, LA.—Ethyl Corp., John H. Schaefer, vice president in charge of manufacturing, contemplates a $20 million expansion program.

SHREVEPORT, LA.—Mosher Steel Co., Houston, Tex., recently incorporated with a capital stock of $100,000, has purchased land here and plans to build a fabricating plant.

MARYLAND

BALTIMORE—Rustless Iron & Steel Division, American Rolling Mill Co., will spend $260,000 to repair and improve its present scrap yard runway.

MICHIGAN

FENTON, MICH.—Fenton Carbide Tool Co., 301 N. Leroy, has been formed by Gerald Schlee with a capital of $50,000 to manufacture and sell cutting tools, jigs and kindred items.

HIGHLAND PARK, MICH.—Chrysler Corp. will build a $159,727 factory addition here. Plans are by Albert Kahn Associated Architects & Engineers Inc.

KALAMAZOO, MICH.—Shakespeare Co. has awarded a $55,000 contract to Dillingham & Sons for a plating works plant.

MUSKEGON, MICH. — Brunswick-Balke-Collender Co. has started construction on a $107,000 drying kiln building.

PLYMOUTH, MICH.—Century Metal Products Co., 322 Hamilton St., has been formed by Frank Arlen with a capital of $100,000 to manufacture steel articles.

ROYAL OAK, MICH.—Boyd Tool Co., 711 E. Fourth St., has been formed by George H. Boyd with a capital of $200,000 to manufacture tools, dies, jigs and machines.

MISSOURI

SPRINGFIELD, MO.—St. Louis, San Francisco & Texas Railway, H. B. Barry, chief engineer, plans construction of a $5 million expansion project to include a freight yard with 40 miles of new track, 2-story office building, 100,000-gallon water tank, roundhouse for 50 locomotives and a 400-ton coal chute.

OHIO

BAYBRIDGE, O.—Medusa Portland Cement Co., Cleveland, has started work on a $100,000 generator building here which will house a turbo-generator and other equipment.

CLEVELAND—Industrial Designing & Mfg. Co., 4500 Euclid Ave., has been incorporated by William G. Drautz to manufacture tools, jigs and fixtures.

CLEVELAND—Nickel Plate Road, Terminal Tower Bldg., will build a diesel repair shop at 2680 E. 75th St., to cost $218,000.

CONNEAUT, O.—Exomet Inc., recently organized with a capital of $100,000, has leased a foundry building now under construction on W. Maple Ave.

MADISON, O.—Euclid Electric & Mfg. Co., 1335 Chardon Rd., Cleveland, is building a 120 x 140 ft building here on Edwards St.

NILES, O.—National Gypsum Co. will launch a $175,000 expansion program at its plant here.

PENNSYLVANIA

POTTSVILLE, PA.—Pottsville Industries Inc. c/o Herm Meltzer, Peacock St., will build a $350,000 manufacturing plant. Architect is Philip G. Knoblock, 1811 W. Market St.

TENNESSEE

MEMPHIS, TENN.—General Dry Batteries Inc., 13000 Athens St., Cleveland, will build a $150,000 manufacturing plant here.

TEXAS

DALLAS, TEX.—First Texas Chemical Co., V. M. Payne, president, received a low bid of $132,600 from I. C. Bateson Construction Co., 622 Irwin-Keasler Bldg., for construction of a factory at 1810 N. Lamar St. Architects and engineers are H. B. Gieb & Associates, Texas Bank Bldg.

EL PASO, TEX.—Texas Aluminum Casting Co. has abandoned its aluminum foundry project.

HOUSTON, TEX.—Cook Paint & Varnish Co., R. L. Liston, manager, has almost completed plans for construction of a 1-story plant at Crocket & Oliver Sts. to cost approximately $150,000. Architect is Wyatt C. Hedrick, 5201 Fannin St.

WEST VIRGINIA

BLUEFIELD, W. VA.—Norfolk & Western Railway has let a contract to Sturm & Dillard Construction Co., Columbus, O., for construction of first section of a $12 million main line project.

WISCONSIN

EAST TROY, WIS.—Trent Tube Co. recently suffered severe damages to its plant from fire.

MILWAUKEE—American Partition Corp., 3043 N. 30th St., will build a $100,000 1-story factory. Consulting engineer is S. Gellman, 308 N. North Ave.

CANADA

GREAT FALLS, MAN. — Ogama-Rockland Gold Mines, 80 W. King St., Toronto, Ont., plans to spend $250,000 on mine development and mine sinking.

RED LAKE, ONT.—Dickenson Red Lake Mines Ltd., 200 Bay St., Toronto, will spend $300,000 on extensive mine developments.

SIOUX LOOKOUT, ONT.—Lunward Gold Mines Ltd., 320 Ray St., Toronto, plans a $2,711,200 development project which will include mine sinkings and surface buildings and equipment.

BEAUHARNOIS, QUE.—Dominion Alkali & Chemical Co. has awarded contracts for design and construction of a chlorine and caustic soda plant to H. K. Ferguson Co., Hanna Bldg., Cleveland.

QUEBEC CITY, QUE.—Crane Steel Ware Ltd. will reconvert a munitions plant at a cost of $300,000.